G3

MW0945B
MW0946B
MW0947B

Plug-in Units for MW9040B
Service Manual

Ninth Edition

To ensure that the MW0945B/MW0946B/ MW0947B Plug-in Units is used safely, read the safety information in the MW9040B Optical Time Domain Reflectometer Operation Manual first. Keep this manual with the Plug-in Unit.

MP MASTER
MA35858

Measurement Solutions

ANRITSU CORPORATION

JUN.
2001

Document No.: M-W0720BE-9.0

CERTIFICATION

ANRITSU CORPORATION certifies that this instrument has been thoroughly tested and inspected, and found to meet published specifications prior to shipping.
Anritsu further certifies that its calibration measurements are based on the Japanese Electrotechnical Laboratory and Radio Research Laboratory standards.

WARRANTY

All parts of this product are warranted by Anritsu Corporation of Japan against defects in material or workmanship for a period of one year from the date of delivery.
In the event of a defect occurring during the warranty period, Anritsu Corporation will repair or replace this product within a reasonable period of time after notification, free-of-charge, provided that: it is returned to Anritsu; has not been misused; has not been damaged by an act of God; and that the user has followed the instructions in the operation manual.

Any unauthorized modification, repair, or attempt to repair, will render this warranty void.

This warranty is effective only for the original purchaser of this product and is not transferable if it is resold.

ALL OTHER EXPRESSED WARRANTIES ARE DISCLAIMED AND ALL IMPLIED WARRANTIES FOR THIS PRODUCT, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO A PERIOD OF ONE YEAR FROM THE DATE OF DELIVERY. IN NO EVENT SHALL ANRITSU CORPORATION BE LIABLE TO THE CUSTOMER FOR ANY DAMAGES, INCLUDING LOST PROFITS, OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES, ARISING OUT OF THE USE OR INABILITY TO USE THIS PRODUCT.

All requests for repair or replacement under this warranty must be made as soon as possible after the defect has been noticed and must be directed to Anritsu Corporation or its representative in your area.

MW0945B/MW0946B/MW0947B
Plug-in Units for MW9040B

Service Manual

June 1992 (First Edition)

April 2001 (Ninth Edition)

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Printed in Japan

MW0945B
MW0946B
MW0947B

Plug-in Units for MW9060A
Service Manual

Ninth Edition

To ensure that the MW0945B/MW0946B/ MW0947B Plug-in Units is used safely, read the safety information in the MW9060A Optical Time Domain Reflectometer Operation Manual first. Keep this manual with the Plug-in Unit.

Measurement Solutions

ANRITSU CORPORATION

Document No.: M-W0720BE-9.0

MW0945B/MW0946B/MW0947B
Plug-in Units for MW9060A

Service Manual

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April 2001 (Ninth Edition)

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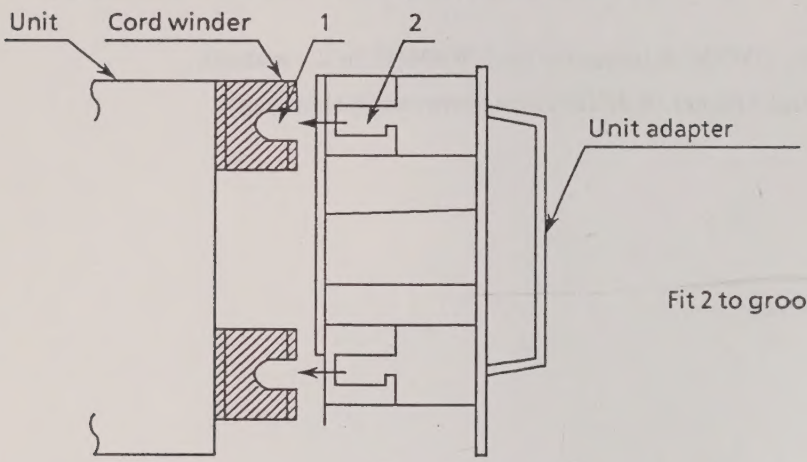
Printed in Japan

MANUAL CHANGE FOR MW0945B/MW0946B/MW0947B

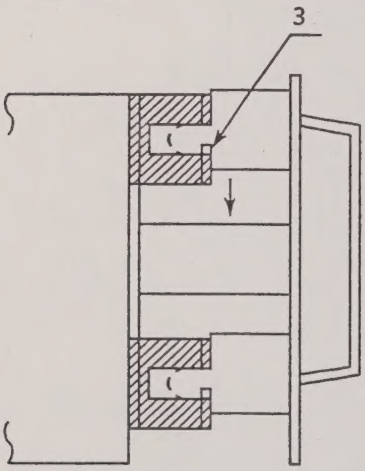
Read the type name as MW9060A instead of the MW9040B in this manual.

Fitting method for Unit Adapter (W39B8752) as shown on the next page.

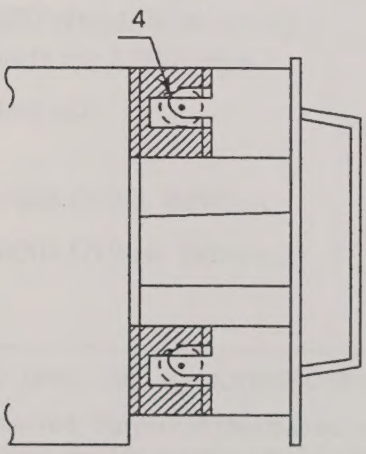
• Fitting Method for Unit Adapter



Fit 2 to groove of cord winder 1.



Fit groove of 3 to cord winder.



Lock adapter by turning knob 4 clockwise.

For Safety

For safety, do not open the equipment covers.

If repair is required, contact the sales representative, branch office, or agent at the telephone number and address given in this document or in the equipment operation manual.

Although not recommended by Anritsu Corporation, if it is really imperative to open the covers for emergency repair, take great care not to touch any dangerous parts.
Always request repair by a trained engineer who understands the hazards.

Anritsu Corporation will not accept liability for any injuries sustained as a result of opening the equipment covers.

CAUTION

FOR CONTINUED FIRE PROTECTION REPLACE ONLY WITH SPECIFIED TYPE AND RATED FUSE.

Part Names & Part Numbers

Please specify the part numbers shown in the parts list when making inquiries or when ordering parts. There may be a difference between the names of parts used in this manual and the parts actually used in the equipment or supplied for repair. This is because equivalent parts with the same functions, performance and reliability as the parts specified in the circuit diagrams and parts list have been used or supplied. Since the parts are equivalent, they have absolutely no adverse effect on the equipment specified functions, performance or reliability.

Note:

WARNINGs, ***CAUTION***s, ***Note***s, and Explanatory footnotes are used in this manual. Their meanings are given below:

WARNING:	***WARNING is used when there is a personal injury hazard.***
CAUTION:	***CAUTION is used when the equipment may be damaged.***
Note:	Note is used to provide information about exceptions, corrections, and restrictions.
Explanatory footnote:	Explanatory footnotes provide comments on the same page as the text, figure or table. They are referenced by either an asterisk (*) or by combination of an asterisk and numeral.

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Power Line Fuse Protection

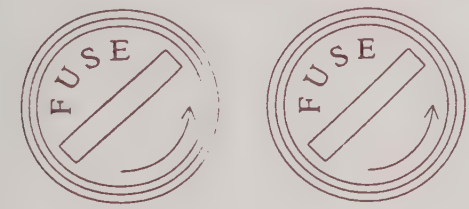
For safety, Anritsu products have either one or two fuses in the AC power lines as requested by the customer when ordering.

Single fuse: A fuse is inserted in one of the AC power lines.

Double fuse: A fuse is inserted in each of the AC power lines.

Example: An example of the double fuse is shown below:

Fuse Holders



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SECTION 1
GENERAL

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1.1 Introduction

This service manual describes the repair and adjustment of the MW0945B/MW0946B/MW0947B plug-in units for the MW9040B Optical Time Domain Reflectometer.

Section 2 describes how to disassemble and reassemble the plug-in units, and the internal configuration.

Section 3 describes how to torubleshoot and repair when a problem occurs during measurements or when abnormalities are detected during performance checks.

Section 4 describes how to adjust the plug-in units after repair or performance checks.

Section 5 describes the circuit parts lists and how to order replacement parts.

Refer to the MW9040B main-frame service manual during service.

WARNING

The plug-in units use a laser diode as the light source. Do not look directly into the laser radiation emitted from OUTPUT.

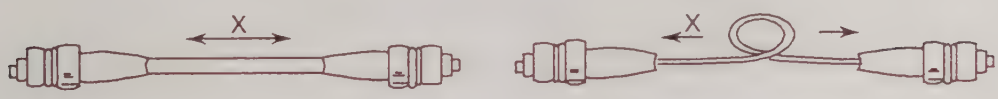
An OUTPUT connector protective cover is provided to protect the operator. A safety circuit is also installed to prevent emission of laser radiation until the optical fiber connector is connected.

CAUTION

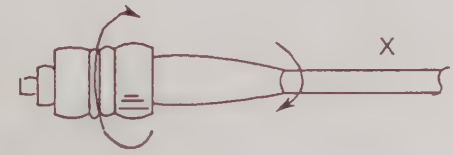
1. *Insert or remove the plug-in unit only when the MW9040B POWER switch is set to OFF. And confirm that the plug-in unit is locked after mounting it.*
2. *Always ground the ground terminals (⏚) on the MW9040B mainframe rear panel to prevent accidental electric shock.*
3. *Do not touch or insert metal items into the connectors in the plug-in unit when the power switch is on.*
4. *Do not plug the power cord into the ac outlet when the power switch is on.*
5. *Make sure the line voltage to be supplied. Also confirm that the correct fuse is being used (Refer to the MW9040B Operation Manual).*

Notes: Precautions on handling optical fiber cable and optical connectors

1. Do not pull the optical fiber cable too hard or bend it too sharply.

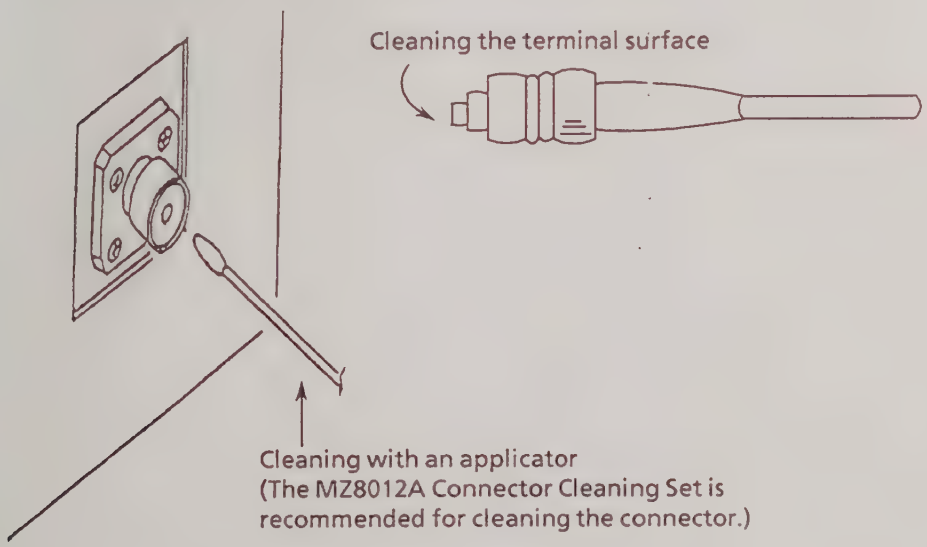


2. Do not twist the fiber cable where it is connected to the optical connector.



3. Confirm that there is no dust or condensation on the optical adapter or plug. Be especially careful of the fiber terminal surface. Use caps and always keep the parts clean. An applicator moistened with alcohol should be used for cleaning.
4. If the fiber under test is connected to the OUTPUT connector and no trace is displayed on the CRT although the ON/OFF switch is on and the LED is on, it may be due to dust in the connector, or the fiber under test may be broken near the measured section.

   Clean the connector terminal surface or use another cable.


Cleaning the terminal surface
Cleaning with an applicator
(The MZ8012A Connector Cleaning Set is
recommended for cleaning the connector.)

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SECTION 2
MECHANICAL CONFIGURATION AND CIRCUIT REFERENCE

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2.1 Introduction

This section describes the mechanical structure, the position of the internal units, and the procedures for removing these units to disassemble and reassemble the MW0945B, MW0946B and MW0947B.

Table 2-1 lists the mechanical parts. Figure 2-1 shows a disassembled view of the plug-in unit.

2.2 Precautions

Always follow the procedure below before disassembly and reassembly.

Step	Procedure
1	Turn off the MW9040B power switch.
2	Unplug the plug for the AC outlet.
3	Remove the plug-in unit from the MW9040B mainframe.

Failure to follow this safety procedure may cause fire and electrical shock hazards that could result in personal injury.

2.3 Cabinet Disassembly (See Fig. 2-1)

2.3.1 Cover removal

Remove the flat-head screws at the top and side of the plug-in unit and remove covers ① and ③.

2.3.2 Rear panel removal

Disconnect Ⓐ, Ⓑ and Ⓒ. After that remove the phillips screws on the rear panel except for the three in the middle and remove the rear panel I/O and AO driver.

2.4 Connector Exchange

This paragraph describes how to change the connector adaptor. Refer to Fig. 2-1 through 2-6.

Step	Procedure
1	Remove the flathead screws at the top and side of the plug-in unit and remove covers ① and ③. (See Fig. 2-1)
2	Remove the flathead screws at the upper side of the structure of connector cap ④ and the flathead screws at the bottom of the plug-in unit, and then remove the connector cap assembly ④. (See Fig. 2-3)
3	Remove the three screws of the connector and remove the connector ㊿. (See Fig. 2-3)
4	Remove the connector adaptor ㊶. (See Fig. 2-3)
Note:	When you exchange Runge, D4 or Diamond Connectors, go to Step 7.
5	Fit the desirable connector adaptor ㊷㊸㊹. (See Fig. 2-4)
6	Fit the connector ㊿ to the plug-in unit. (See Fig. 2-4)
7	Remove the flathead screws at the connector㊿and remove the cover㊽. (See Fig. 2-5) Fit the desirable exchange unit ㊺ ㊻ ㊼ to connector ㊿ instead of connector adaptor ㊶. (See Fig. 2-6)
8	Fit the exchange unit ㊺㊻㊼ to the plug-in unit. (See Fig. 2-6 and 2-7)
9	Fit the connector cap assembly ④ to the plug-in unit.
10	Fit the cover ① and ③ of Fig. 2-1 to the plug-in unit.

Table 2-1 Mechanical Parts List for Fig. 2-1

No.	Dwg. No.	Description	Qty.
①	W32B10393	Cover (1)	1
②	W34B6668F	Frame	1
③	W3B10394	Cover (2)	1
④	————	Connector cap Assembly	1
⑤	W42B22780C	Lid	1
⑥	W32B6636C	Case	1
⑦	W4B17734	Shielding Sheet	1
⑧	W4B17735	Fitting Sheet	1
⑨	No. 1002	Unit Lock	1
⑩	W4B21030	Fitting Plate	2
⑪	W43N24975D	Rear Panel (MW0945B)	1
	W43N24975E	Rear Panel (MW0946B)	1
	W43N24976F	Rear Panel (MW0947B)	1
⑫	W42N20697	Lock Knob	1
⑬	W4B24976	Cord Winder	2
⑭	W3H8337	Shielding Case	1
⑮	W3H8336	Shielding Case	1
⑯	W3B8340	Cover	1
⑰	W4B28803	Lid (1)	1
⑱	W4Z28992	97-520-19 2 hills (Shield Fingers)	1
⑲	W4Z28992B	97-520-19 1 hill (Shield Finger)	1
⑳	34H39509A	M2.6-B1 Stud	2

Table 2-2 Mechanical Parts List for Fig. 2-2

No.	Dwg. No.	Description	Qty.
㉚	W42H24798	Connector Cap	1
㉛	W42B22083	Case (5)	1
㉜	W42B22081	Case (3)	1
㉝	W4B22086B	Case (4)	1
㉞	W4B22558	Metal Fitting	1
㉟	W4B22088	Plate	2
㊱	ES2B-23	Hinge	1
㊲	No. 1337	UM10B10F01	1
㊳	W4Z22612	Clip	1
㊴	44Z79621AF	Spring	1
㊵	W4B28804	Angle	1
㊶	W4Z28994	97-540-19 8 hills (Shield Fingers)	1

Table 2-3 Mechanical Parts List for Figs. 2-3 to 2-7

No.	Dwg. No.	Description	Remarks	Qty.
㊿	W49H17927B	Connector		1
㊿①		Connector adaptor	FC	1
㊿②	W4Y22935B	Connector adaptor	SC	
㊿③	W4Y22935C	Connector adaptor	ST	
㊿④	W4Y22935A	Connector adaptor	DIN	
㊿⑤	W4Y22935D	Exchange Unit	RUNGE	
㊿⑥	W4Y22935E	Exchange Unit	D4	
㊿⑦	W4Y22935F	Exchange Unit	Diamond (HMS-0)	
㊿⑧	W4B28806	Cover		1
㊿⑨	W4Z28993	97-536-19 2 hills (Shield Fingers)		1
㊿⑩	W4Z28994	97-540-19 8 hills (Shield Fingers)		1
㊿①	W4B29794	Angle (2)		1
㊿②	W4B29793B	Angle (1)		1
㊿③	W4B29793A	Angle (1)		1
㊿④	W4B29795	Angle (B)		1
㊿⑤	W4B29782	Angle (A)		1

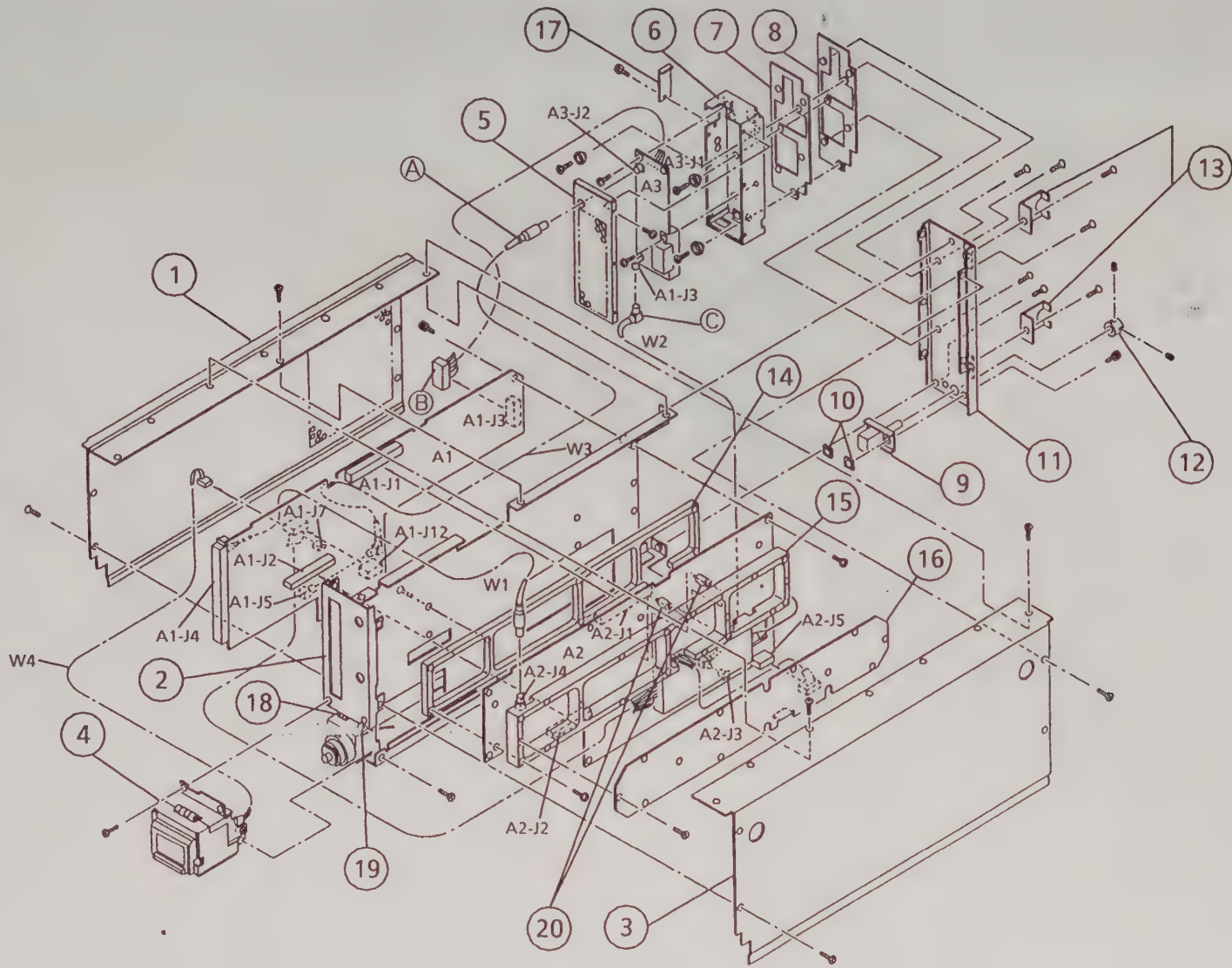

Fig. 2-1 Plug-in Unit Disassembly

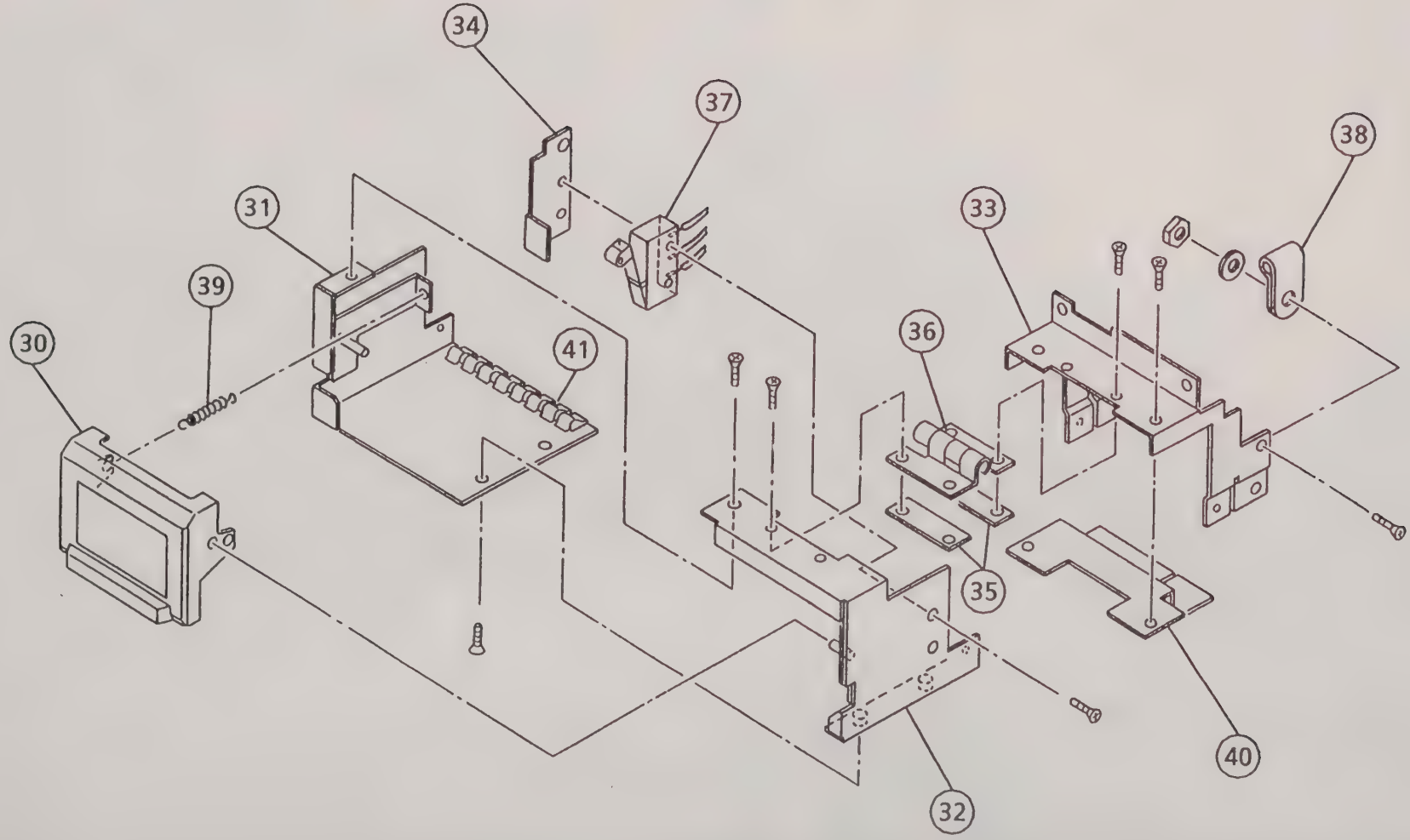

Fig. 2-2 Connector Cap Assembly

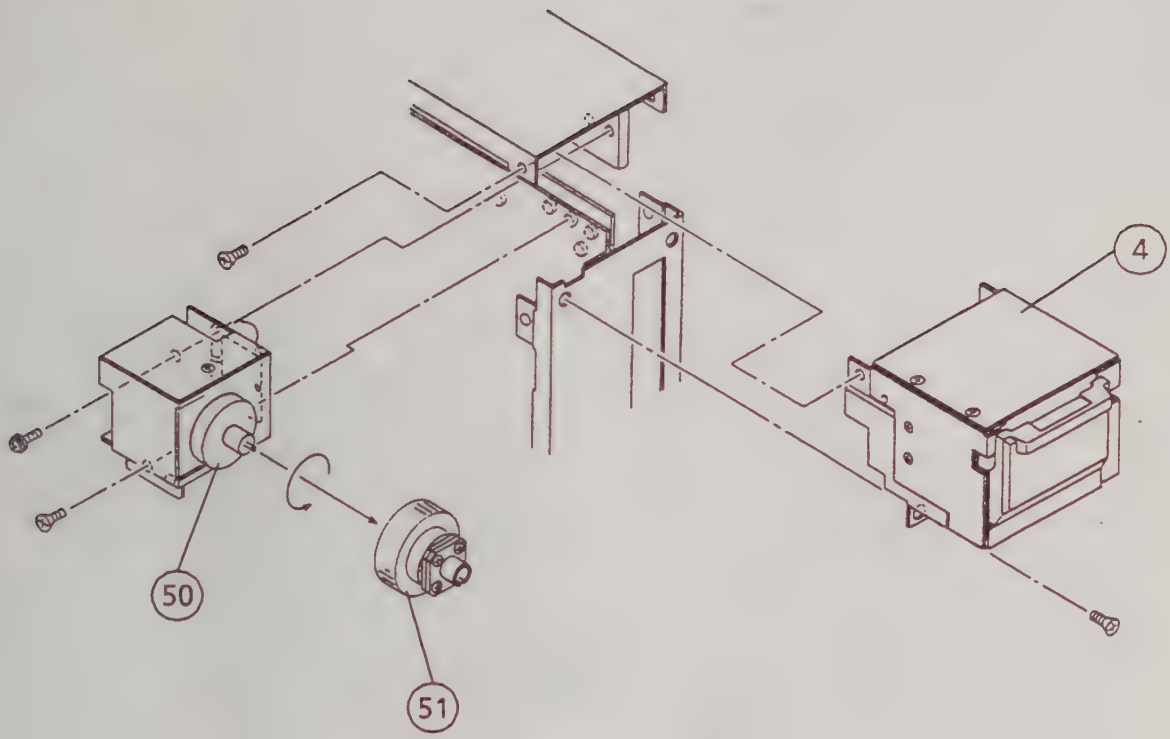

Fig. 2-3 Connector Disassembly (1/2)

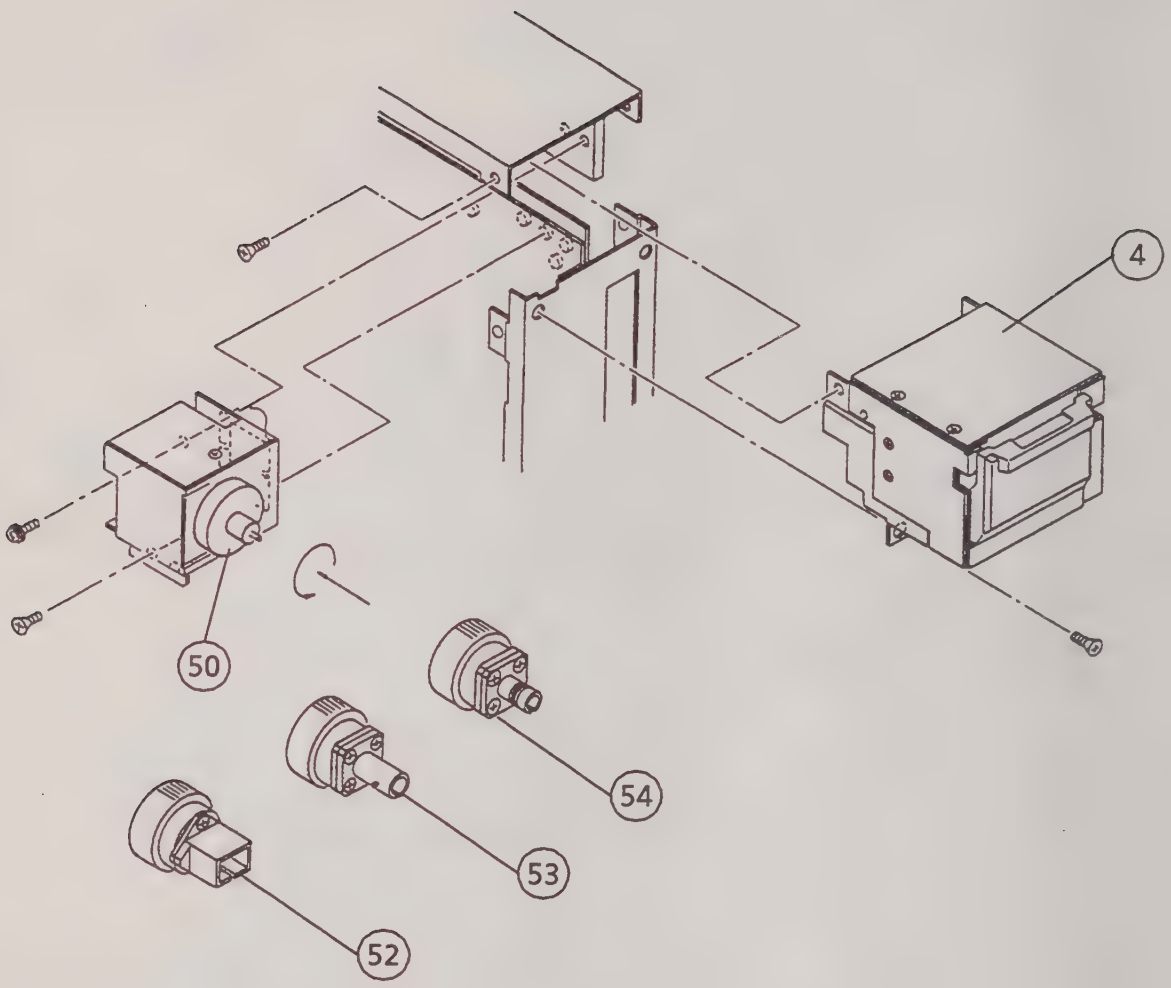

Fig. 2-4 Connector Reassembly (DIN, ST and SC Connectors)

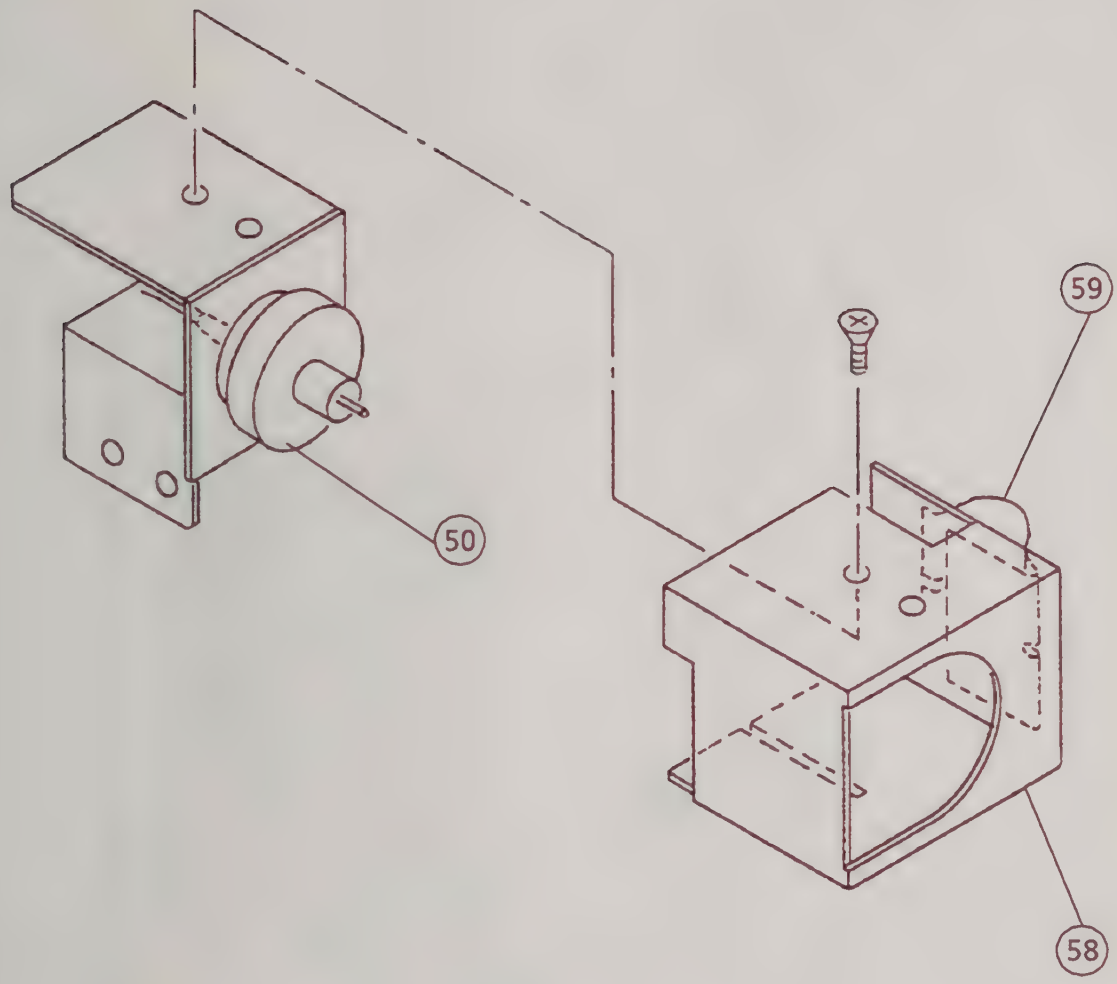

Fig. 2-5 Connector Disassembly (2/2)

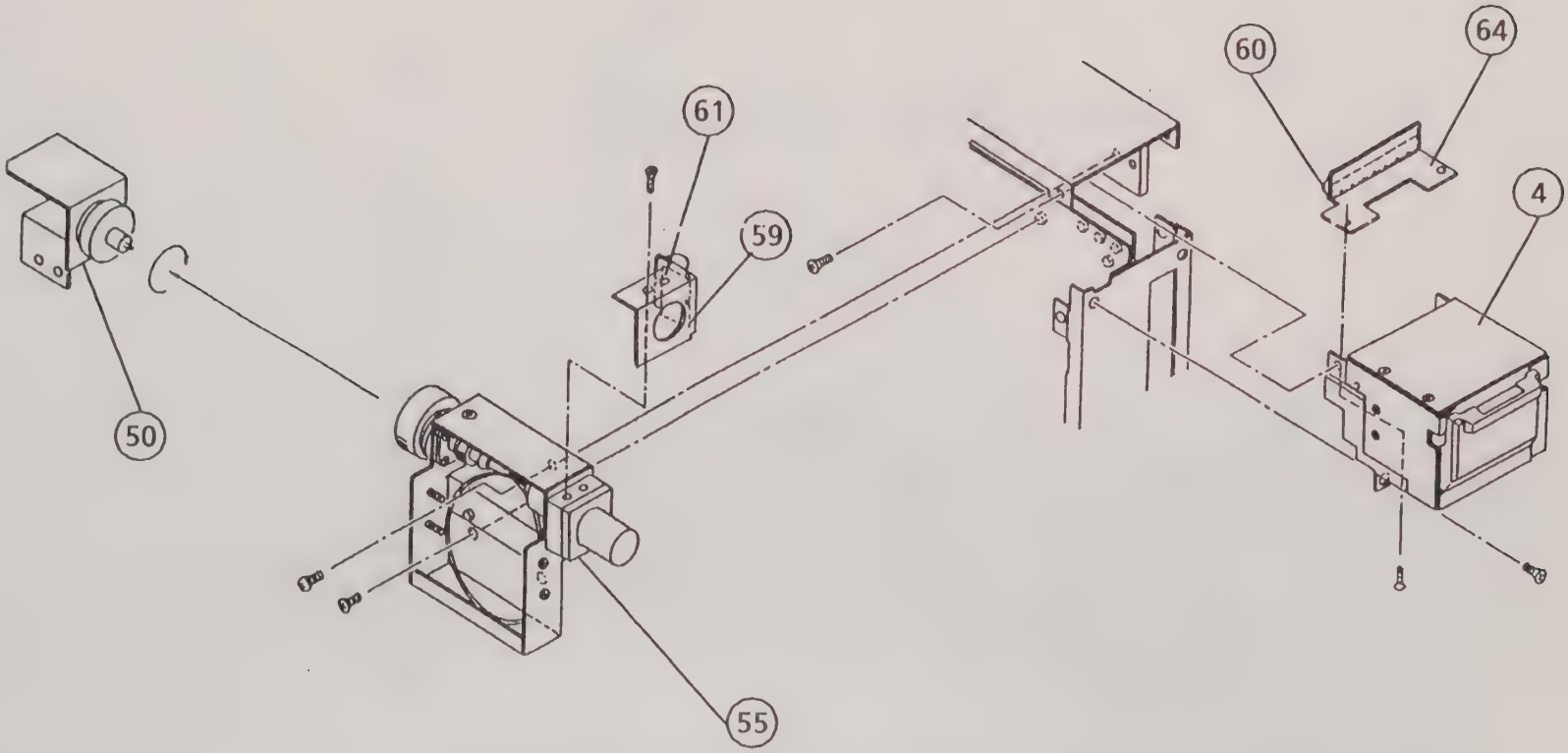

Fig. 2-6 Connector Reassembly (Runge Connector)

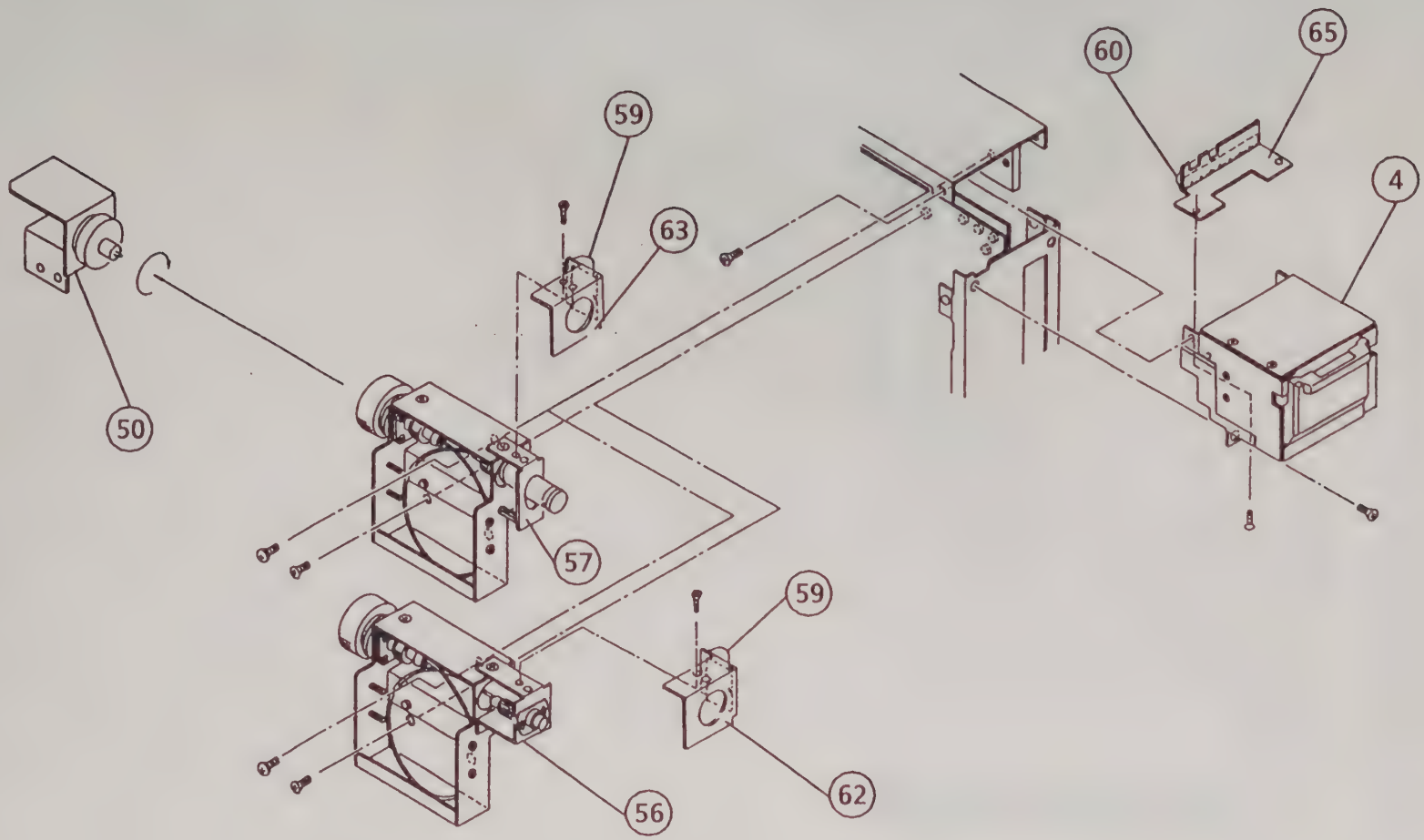

Fig. 2-7 Connector Reassembly (Diamond (HMS-0) and D4 Connectors)

2.5 Circuit Reference

The plug-in unit PC boards are differentiated by "A" numbers, such as A1, or A2. Table 2-4 lists circuit diagram number, circuit names, A numbers and PC board numbers.

Table 2-4 Circuit Reference

Circuit Diagram No.	Names	A No.	PC Board No.
1	Plug-in Unit Overall	——	——————
2	I/O	A1	W22U2212a
3	AMP	A2	W22U2214
4	AO DRIVER (MW0947B)	A3	W32U2212b
4	AO DRIVER (MW0945B)	A3	W32U2212b
4	AO DRIVER (MW0946B)	A3	W32U2212b

SECTION 3
TROUBLESHOOTING AND REPAIR

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- 3.6.4 A3 AO DRIVER PC board 4 3-49

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3.1 Introduction

This section describes troubleshooting and repair methods. It also describes test equipment, parts check method, soldering precautions, etc. that are necessary when troubleshooting and repairing.

3.2 Check and Parts Replacement

3.2.1 Identification marks on PC boards

As shown in Fig. 3-1, PC boards have the unit No., PC board No. with the revision No., PC Board Name, part No. and test points with the test point names.

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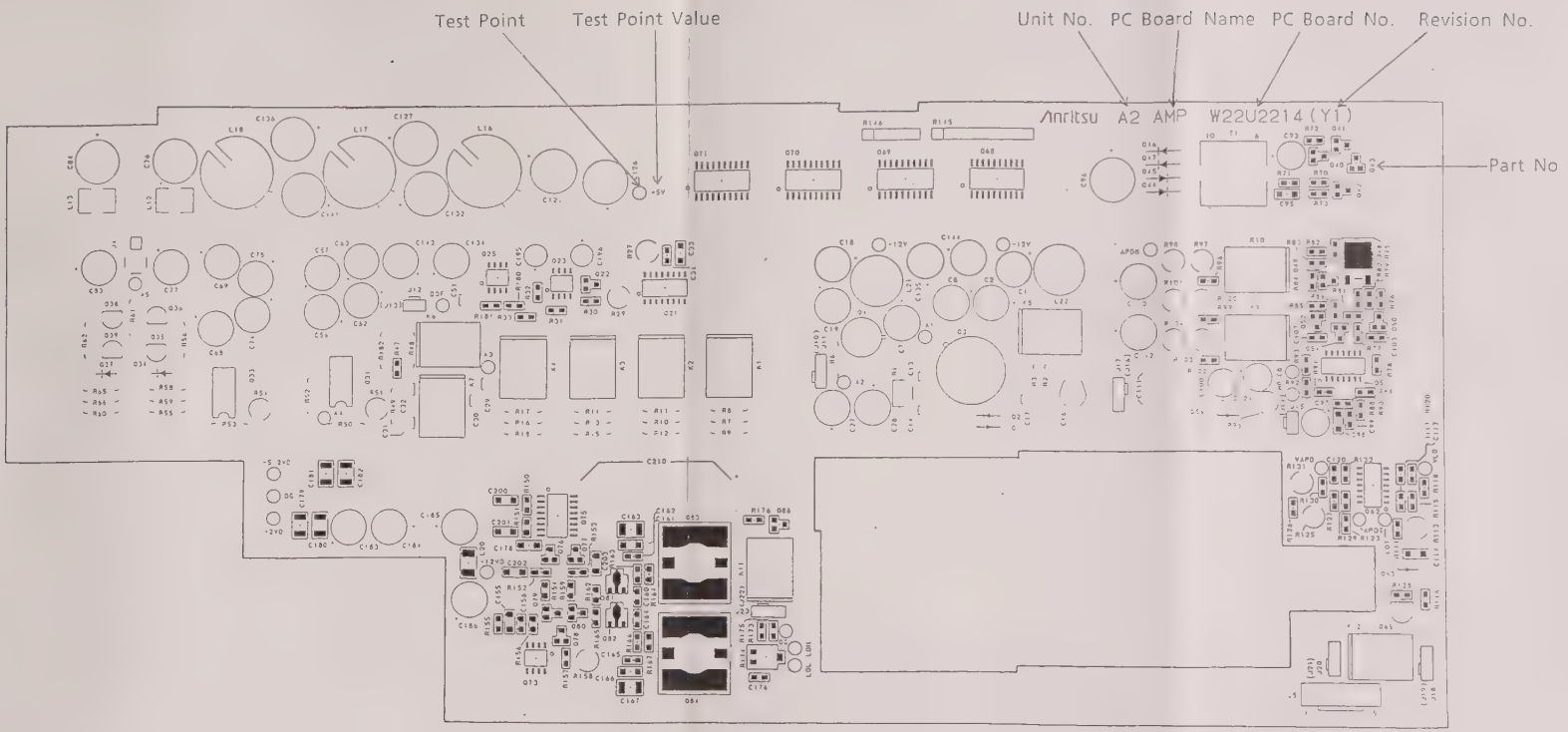


Fig. 3-1 Identification Marks on PC Boards

3.2.2 Notes on soldering and removing components

1. Use an 30- to 40-watt pencil-type insulated soldering iron. If it is not an insulated type, it ma damage the part.
2. When removing a soldered component from a PC board or soldering in a new component, nip the component lead with tweezers to shunt heat.
3. Major component lead tips are bent behind the PC board to ensure secure support. To remove the component, first lift up the lead tips and then remove the component.

3.2.3 Transistor and diode checks

(1) Checking transistors mounted on the PC board

Transistors can be checked in the operating state by measuring the base and emitter potentials. In NPN-type silicon transistors, the base potential is 0.6 or 0.7 V higher than the emitter potential. However, the PNP-type silicon transistors have a base potential that is 0.6 or 0.7 V lower than the emitter. Transistors are faulty if these characteristics are not satisfied.

(2) Checking transistors removed from the PC board

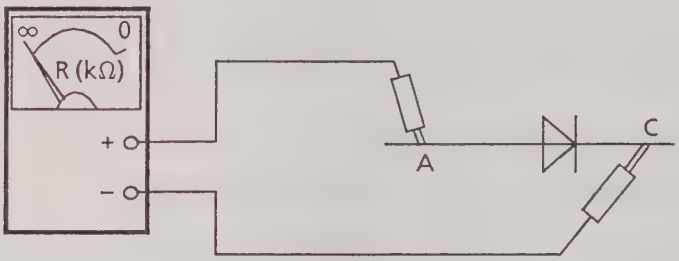
Transistors can be checked by measuring the resistance values between the emitter, base, and collector using an ohmmeter. Reference values are given in Table 3-1. Note that this check should be performed at a measuring current of less than 100 μA.

Table 3-1 Testing Transistors Removed from the PC Board

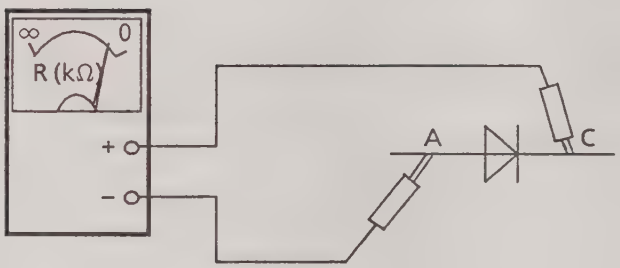
Transistor type	Ohmmeter connection		Resistance (Reference)
	Positive lead	Negative lead	
PNP	Emitter, or Collector	Base	1 to 10 kΩ
	Emitter	Collector	Very high
NPN	Base	Emitter, or Collector	1 to 10 kΩ
	Emitter	Collector	Very high

(3) Checking diodes removed from PC board

Diodes can be checked by measuring the resistance between the A (anode) and C (cathode), and vice versa. If the resistance between A and C is high and the resistance between C and A is low, as shown in Fig. 3-2, the diode is normal.



① Between A and C



② Between C and A

Fig. 3-2 Diode Check

For IS953 as an example, between A (+) and C (−): ∞ between C (+) and A (−): 株 9 kΩ

3.3 Recommended Test Equipment

Table 3-2 lists the recommended test equipment for troubleshooting.

Table 3-2 Recommended Test Equipment

No.	Instrument and device	Required specifications	Remarks
1	Digital multimeter	Measuring voltage range: 0 to ±100 Vdc	
2	Oscilloscope	Frequency range: DC to 300 MHz	
3	50 Ω terminator	50 Ω	
4	20 dB attenuator	20 dB	
5	BNC-OSM cord		A cord with BNC and OSM connectors
6	Optical power meter with optical sensor	Wavelength: 0.75 to 1.8 μm Measuring range: −55 to 0 dBm	Anritsu ML9001A (Indicator) and MA9712A (Sensor)
7	Optical attenuator	1.3 μm/1.5 μm band Single-mode fiber Maximum attenuation: 65 dB	Anritsu MN924A
8	Optical fiber cable 1	Single-mode fiber, ≧5 km	
9	Optical fiber cable 2	Single-mode short fiber, 1 to 2 m	
10	Waveform monitor	Wavelength: 1.0 to 1.6 μm	Anritsu MP96A
11	Ohmmeter		

3.4 Service Kit

For each plug-in unit, an extender cable shown in Table 3-3 is available. (W4Y21353)

Table 3-3 Service Kit

No.	Names	Remarks
1	Extender Cable 1	For connecting the MW9040B to the Plug-in Unit

3.5 Block Diagram and Overall Troubleshooting

Before troubleshooting the plug-in unit, first troubleshoot the MW9040B according to the MW9040B Service Manual.

If the plug-in unit is assumed to be faulty, perform subsequent troubleshooting while it is connected to the MW9040B with the Extender cable 1 (Table 3-3).

3.5.1 Block diagram

Figure 3-3 shows a block diagram of the plug-in unit.

Each plug-in unit consists of an optical module and three PC boards (A1 I/O, A2 AMP, and A3 AO DRIVER). The optical module is fixed on the PC board of A2 AMP. This optical module contains the LD as an emission block, the APD as a light receiving block, and the A/O switch as a directional coupler.

The power supply, control and timing signals necessary for the plug-in unit are fed from MW9040B. The plug-in unit is controlled by the A3 MEAS.CPU of MW9040B.

For the pulse signals from the MW9040B, waveform shaping is effected at the A1 I/O to drive the LD. The optical pulses emitted from the LD are output from the LD OUTPUT terminal through the optical fiber cable extended from the optical module. This optical pulse output enters the test fiber that is presently connected.The backscattering light (reflected from the test fiber) and the Fresnel reflected light enter the APD through the A/O switch. At that time, only the necessary part of the light (reflected from the test fiber) is diffracted and picked up by the A/O switch. In this manner, the unwanted portion of the light is not diffracted, and is thus attenuated. For this reason, it is possible to attenuate a very high level signal as the Fresnel reflected light or leakage light during LD emission. As a result, a near-end dead zone or a dead zone after the Fresnel reflection can be reduced. A weak signal received at the APD is amplified at the A2 AMP amplifier, and then enters the MW9040B. The amplifier block is provided with an attenuator adjustment for regulation of gain. The A1 I/O is provided with a temperature control circuit for the LD and APD and an I/O port.

Control of the plug-in unit and status supervision are affected at the I/O port of the A1 I/O. The I/O port is used in both digital and analog modes. The digital I/O port is used to read out data from ROM where information proper to the plug-in unit is stored, to control the pulse width, wavelength and the mask width, and to detect an open/close condition of the LD OUTPUT unit. The analog I/O port is used to control offset and attenuator and also to detect LD temperature changes.

To prevent the LD wavelength and output power from being affected by variations in ambient temperature, the LD temperature is controlled by a Peltier element. This Peltier element is also used for temperature control in the APD to suppress an increase in dark current.

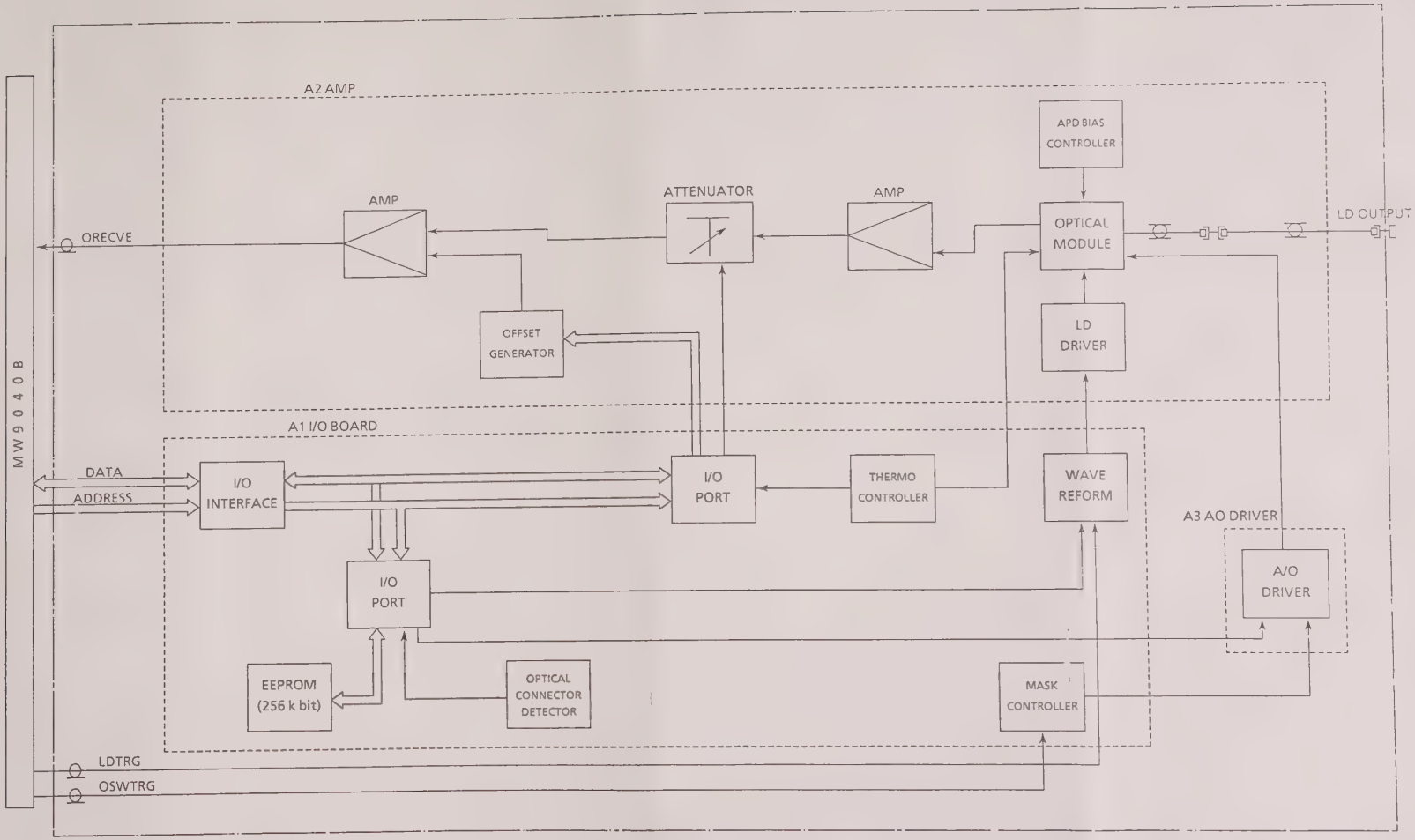
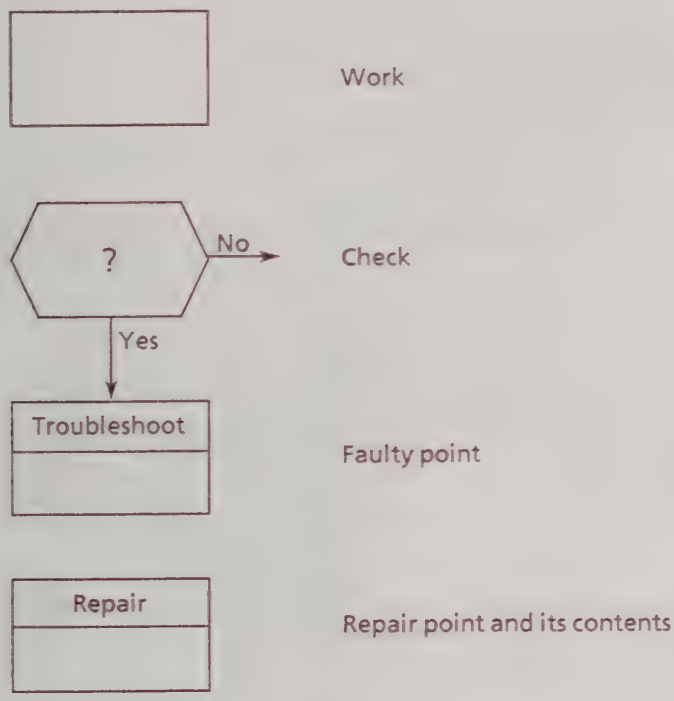


Fig. 3-3 MW0945B, MW0946B, MW0947B Block Diagram

3.5.2 Overall troubleshooting and repair

(1) Flowchart symbols

The flowcharts in the this section use the symbols shown below to explain the troubleshooting procedure.

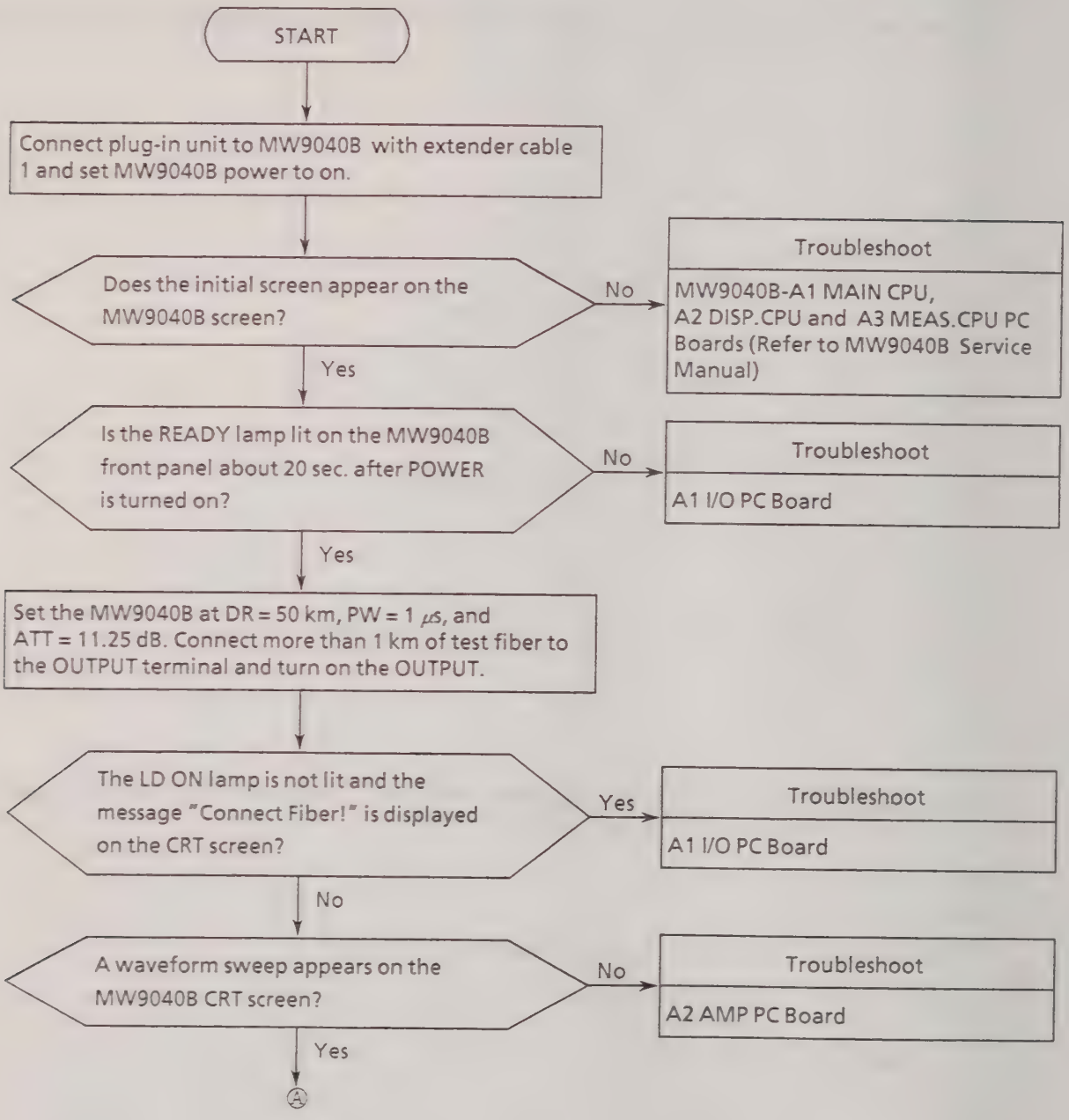


Note: Explanations described below the figures inside the ⬭ symbols are setting conditions for the MW9040B and an oscilloscope to be used for check.

[Example]

DR = 50 km	Distance range 50 km (MW9040B setting)
20 mV/div	Oscilloscope settings (Vertical scale)
50 μs/div	(Horizontal scale)

(2) Main flow of overall troubleshooting


START
Connect plug-in unit to MW9040B with extender cable 1 and set MW9040B power to on.
Does the initial screen appear on the MW9040B screen?
No
Troubleshoot
MW9040B-A1 MAIN CPU, A2 DISP.CPU and A3 MEAS.CPU PC Boards (Refer to MW9040B Service Manual)
Yes
Is the READY lamp lit on the MW9040B front panel about 20 sec. after POWER is turned on?
No
Troubleshoot
A1 I/O PC Board
Yes
Set the MW9040B at DR = 50 km, PW = 1 μs, and ATT = 11.25 dB. Connect more than 1 km of test fiber to the OUTPUT terminal and turn on the OUTPUT.
The LD ON lamp is not lit and the message "Connect Fiber!" is displayed on the CRT screen?
Yes
Troubleshoot
A1 I/O PC Board
No
A waveform sweep appears on the MW9040B CRT screen?
No
Troubleshoot
A2 AMP PC Board
Yes
Ⓐ

Ⓐ

Yes

Connect an optical attenuator, waveform monitor, and oscilloscope to OUTPUT using short fibers. (See Fig. 3-4)

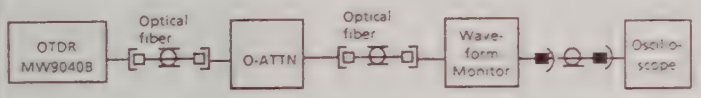


Fig. 3-4 Configuration for Optical Pulse Width Measurement

Is the optical pulse width of the OUTPUT equivalent to the pulse width displayed on CRT screen?

No → Troubleshoot: A1 I/O PC Board

Yes

Return the measuring system to its original state.

Does the waveform level moves up and down equally with ATT value displayed?

No → Troubleshoot: A2 AMP PC Board

Yes

Ⓓ

Ⓓ

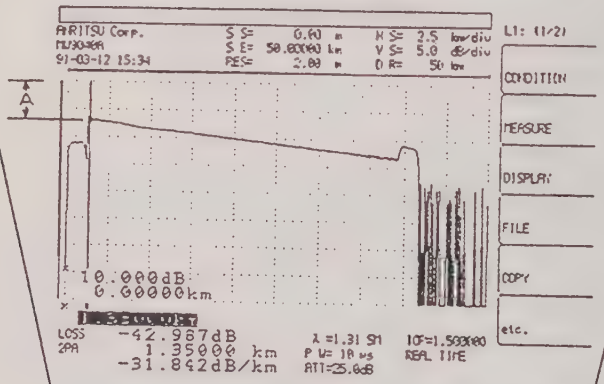
Yes

Is the near-end backscattering light level higher than the value in Table 3-4?

Table 3-4 Near-End Backscattering Light Level

Plug-in unit	Wave-length	Pulse width	ATT	A (Typical value)
MW0945B	1.31 μm	1 μs	11.25 dB	5 dB
MW0946B	1.55 μm	1 μs	11.25 dB	7 dB
MW0947B	1.31 μm	1 μs	11.25 dB	5 dB
	1.55 μm	1 μs	11.25 dB	7 dB

No → Ⓑ



Yes → Ⓒ

When using the MW0947B, the wavelength is the same as the CRT-displayed wavelength?

No → Troubleshoot: A1 I/O PC Board

Yes

END

Ⓑ

Turn the OUTPUT ON/OFF switch to OFF, and disconnect test fiber from the OUTPUT temrinal.
Clean the inside of OUTPUT connector and the surface of test fiber, using alcohol.
Again turn the OUTPUT ON/OFF switch to ON.

Is the near-end backscattering light level higher than the value in Table 3-4?

Yes → Ⓒ

No

Connect an optical power meter to OUTPUT through a short fiber (Fig. 3-5).

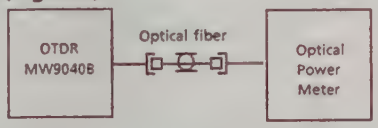


Fig. 3-5 Configuration for output power measurement

Is the OUTPUT power higher than the value in Table 3-5?

Table 3-5 Average optical power output level

Plug-in unit	Wave-length	Pulse width	Distance range	P (Typical value)
MW0945B	1.31 μm	1 μs	50 km	−14.5 dBm
MW0946B	1.55 μm	1 μs	50 km	−17.7 dBm
MW0947B	1.31 μm	1 μs	50 km	−14.5 dBm
	1.55 μm	1 μs	50 km	−17.7 dBm

No → Troubleshoot: A1 I/O PC Board

Yes

Troubleshoot: A2 AMP PC Board

3.6 Circuit Description and Troubleshooting for Each PC Board

3.6.1 Introduction

The plug-in units generate optical pulses by using a laser diode (LD). The optical pulses are supplied to the test fiber through the Acoustooptic (AO) switch. The backscattered light and Fresnel reflection are received through the AO switch by the Avalanche Photodiode (APD), which converts the received light to electrical signals.
In Sections 3 and 4, a voltage is represented as the logic level of the TTL or CMOS. So, refer to the voltage values shown in Table 3-6 below.

Table 3-6 Logic Levels and Voltages

Logic level	TTL	CMOS
High	≧2.0 V	≧3.15 V
Low	≦0.8 V	≦1.3 V

3.6.2 A1 I/O PC board 2

(1) Circuit description

This board contains the I/O port used to control the plug-in unit and supervise various conditions. It also contains the temperature control circuit for the LD/APD and a waveform shaping circuit for LD drive pulses.

The I/O port is electrically isolated for digital and analog purposes through photocouplers Q14 to Q19. The digital I/O port comes in address ports Q6 and Q7 of ROM Q8, data port, wavelength setting and pulse width setting port Q9, and an ON/OFF detection port Q46 for the OUTPUT lid and the port Q40 for the LD current variable mode. The analog I/O port contains a temperature detection port Q39 for the LD.

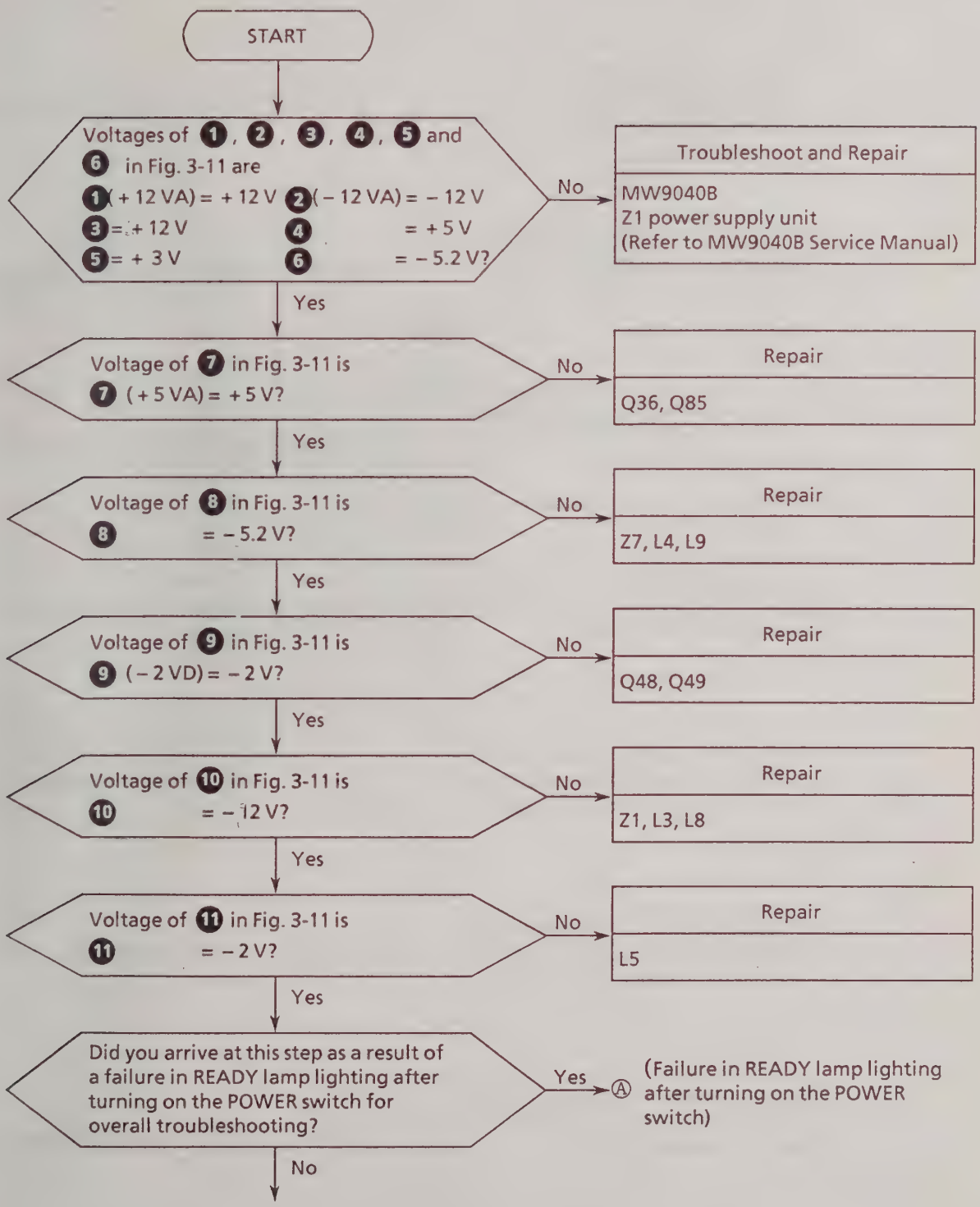
The temperature control circuit of LD and APD applies the LD/APD temperature monitor voltage from the A2 AMP PC board. The voltage is used to even temperatures of the LD and APD with Q80 and Q81.

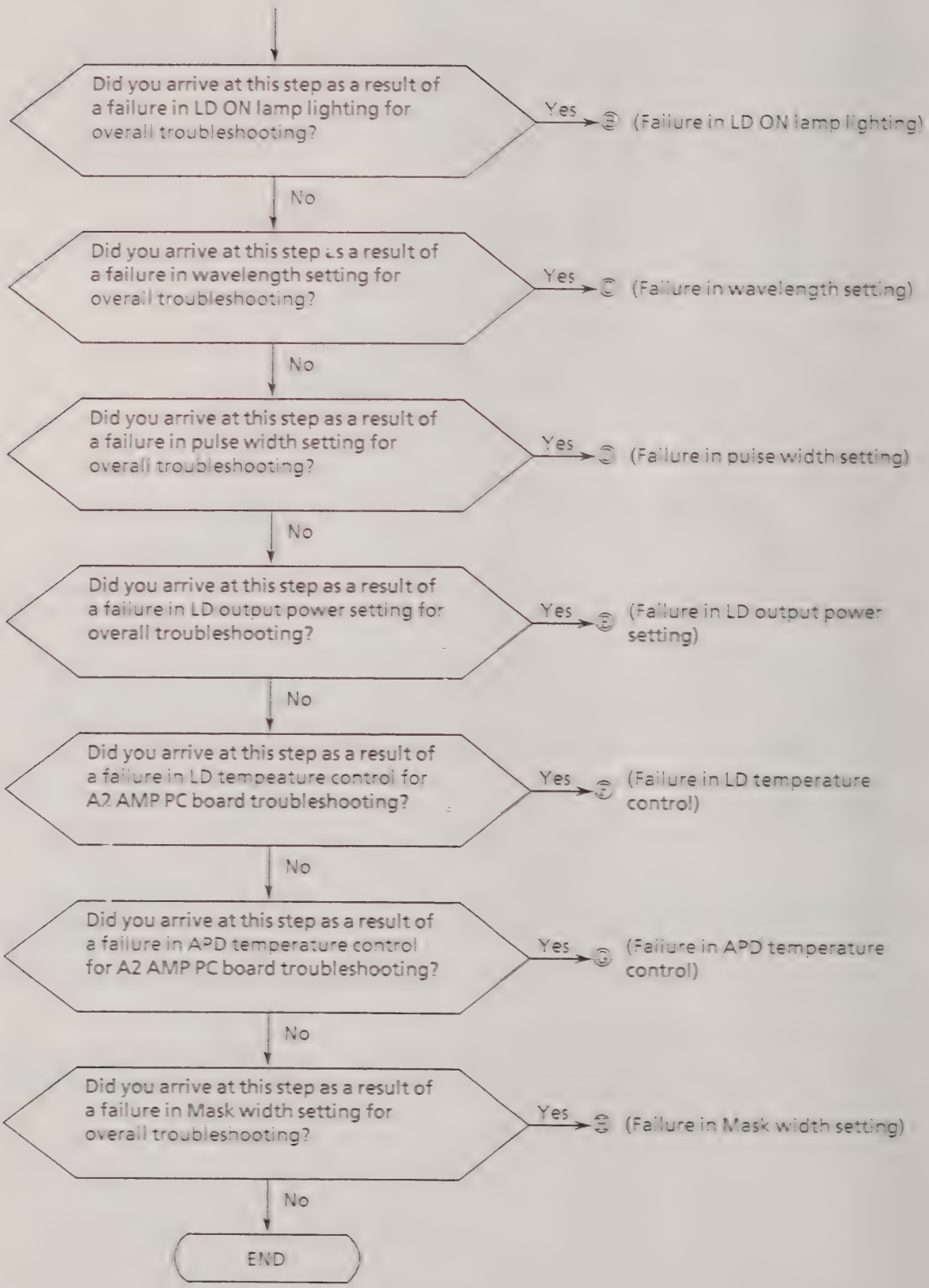
The FET of Q30 drives the Peltier element within the Z1 optical module through J12 to control temperatures at the LD. The FET of Q31 controls temperatures at APD.

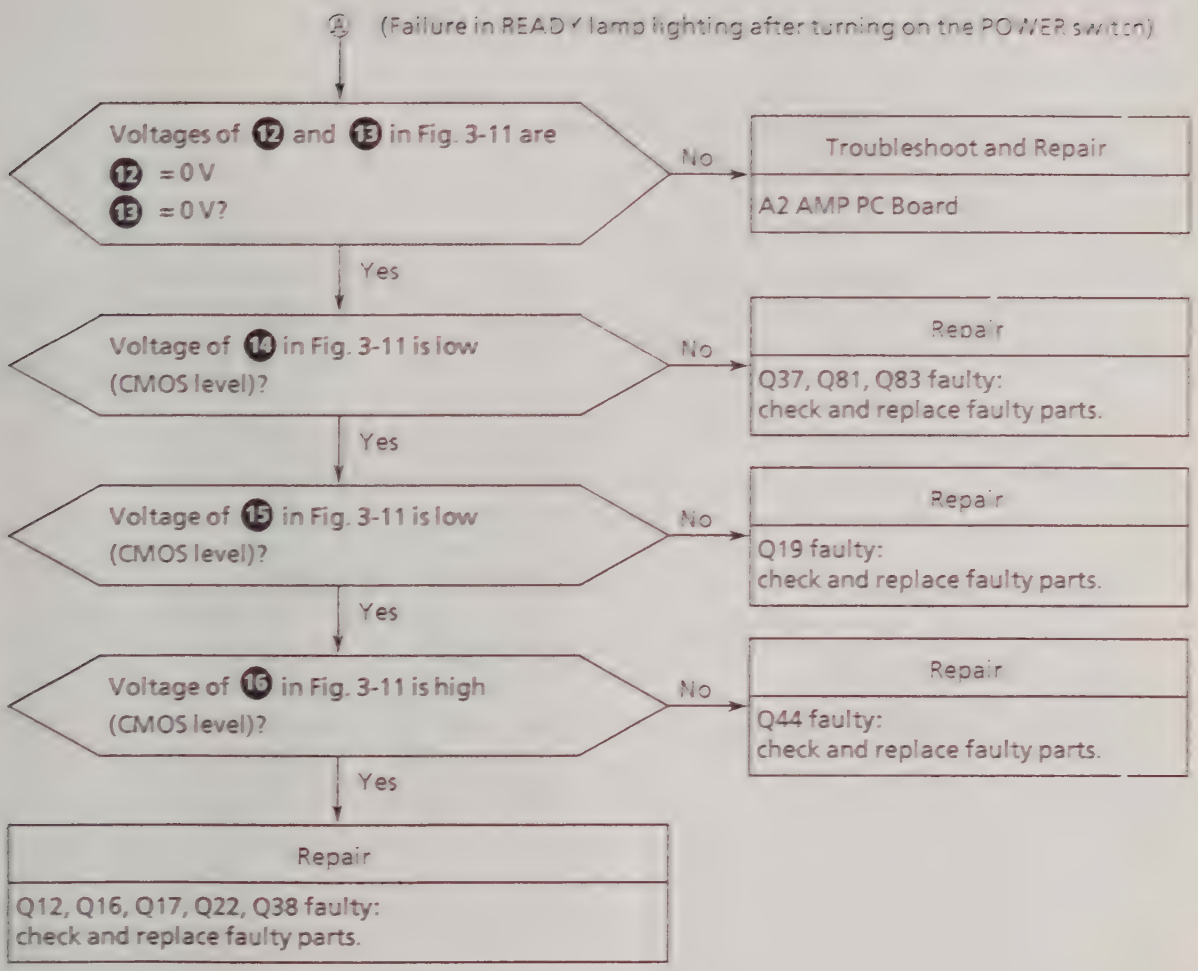
The waveform shaping circuit for LD drive pulses receives ECL-level pulse width signals from the MW9040B via J1-B so that waveform is shaped with Q71. The shaped signals are sent to the A2 AMP PC board by an ECL complement output.

A power supply of −12 V used in the plug-in unit is regulated by the DC/DC converter of Z1.

(2) Troubleshooting and repair




Did you arrive at this step as a result of a failure in LD ON lamp lighting for overall troubleshooting?
Yes
(Failure in LD ON lamp lighting)
No
Did you arrive at this step as a result of a failure in wavelength setting for overall troubleshooting?
Yes
(Failure in wavelength setting)
No
Did you arrive at this step as a result of a failure in pulse width setting for overall troubleshooting?
Yes
(Failure in pulse width setting)
No
Did you arrive at this step as a result of a failure in LD output power setting for overall troubleshooting?
Yes
(Failure in LD output power setting)
No
Did you arrive at this step as a result of a failure in LD tempeature control for A2 AMP PC board troubleshooting?
Yes
(Failure in LD temperature control)
No
Did you arrive at this step as a result of a failure in APD temperature control for A2 AMP PC board troubleshooting?
Yes
(Failure in APD temperature control)
No
Did you arrive at this step as a result of a failure in Mask width setting for overall troubleshooting?
Yes
(Failure in Mask width setting)
No
END


Ⓐ (Failure in READY lamp lighting after turning on the POWER switch)
Voltages of ⑫ and ⑬ in Fig. 3-11 are
⑫ ≈ 0 V
⑬ ≈ 0 V?
No
Troubleshoot and Repair
A2 AMP PC Board
Yes
Voltage of ⑭ in Fig. 3-11 is low (CMOS level)?
No
Repair
Q37, Q81, Q83 faulty:
check and replace faulty parts.
Yes
Voltage of ⑮ in Fig. 3-11 is low (CMOS level)?
No
Repair
Q19 faulty:
check and replace faulty parts.
Yes
Voltage of ⑯ in Fig. 3-11 is high (CMOS level)?
No
Repair
Q44 faulty:
check and replace faulty parts.
Yes
Repair
Q12, Q16, Q17, Q22, Q38 faulty:
check and replace faulty parts.

Ⓑ (Failure in LD ON lamp lighting)

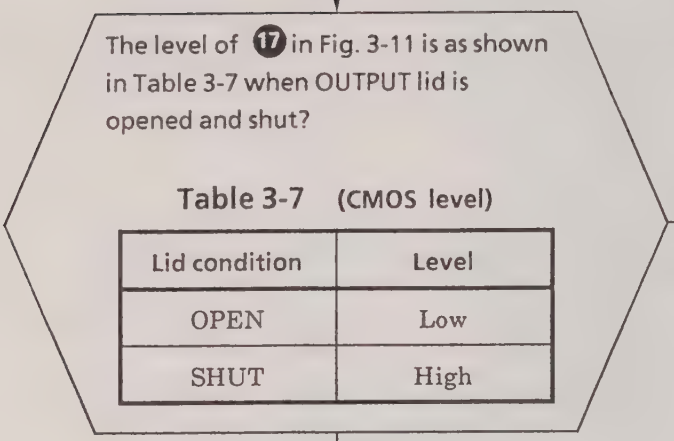


Table 3-7 (CMOS level)

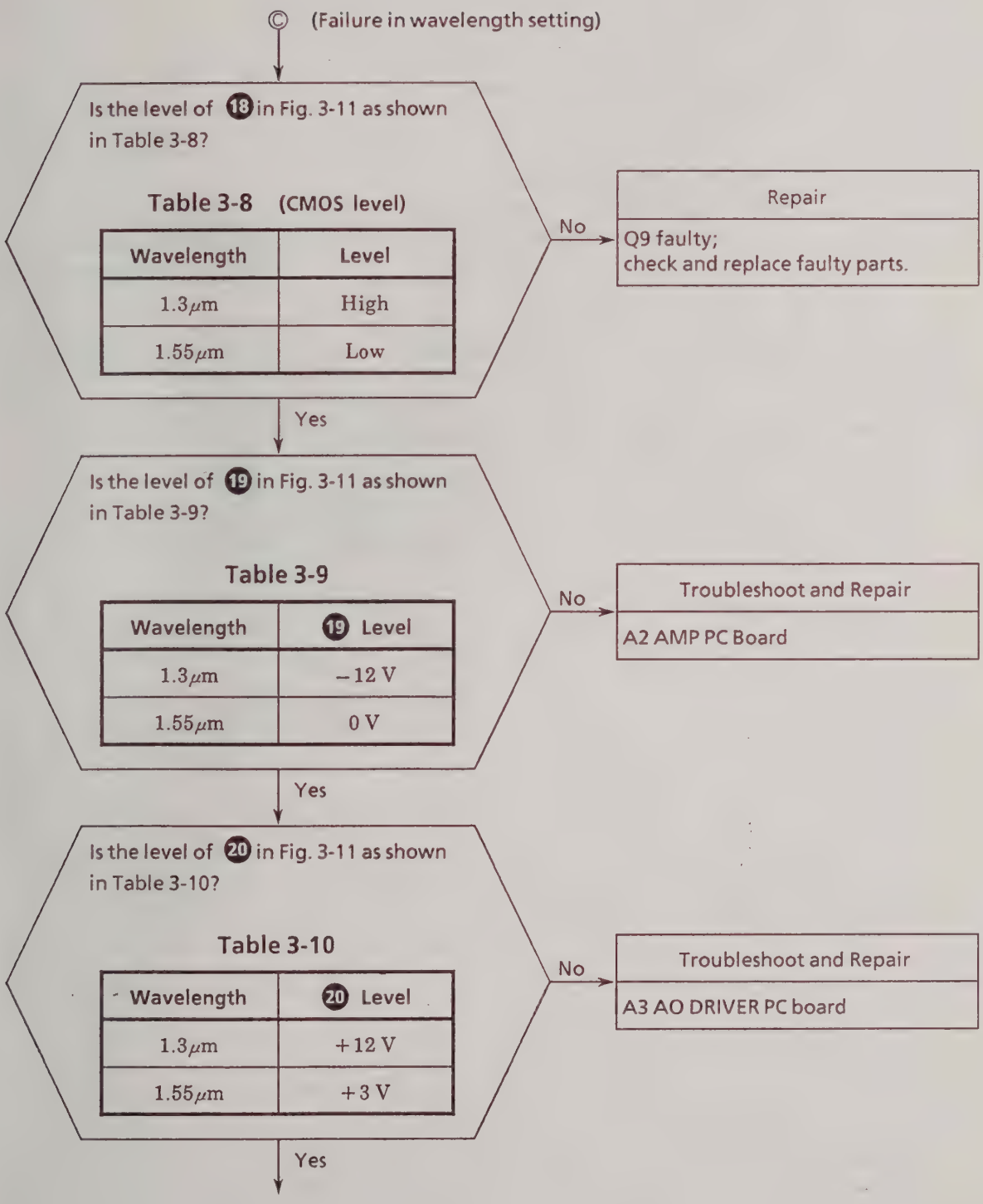
Lid condition	Level
OPEN	Low
SHUT	High

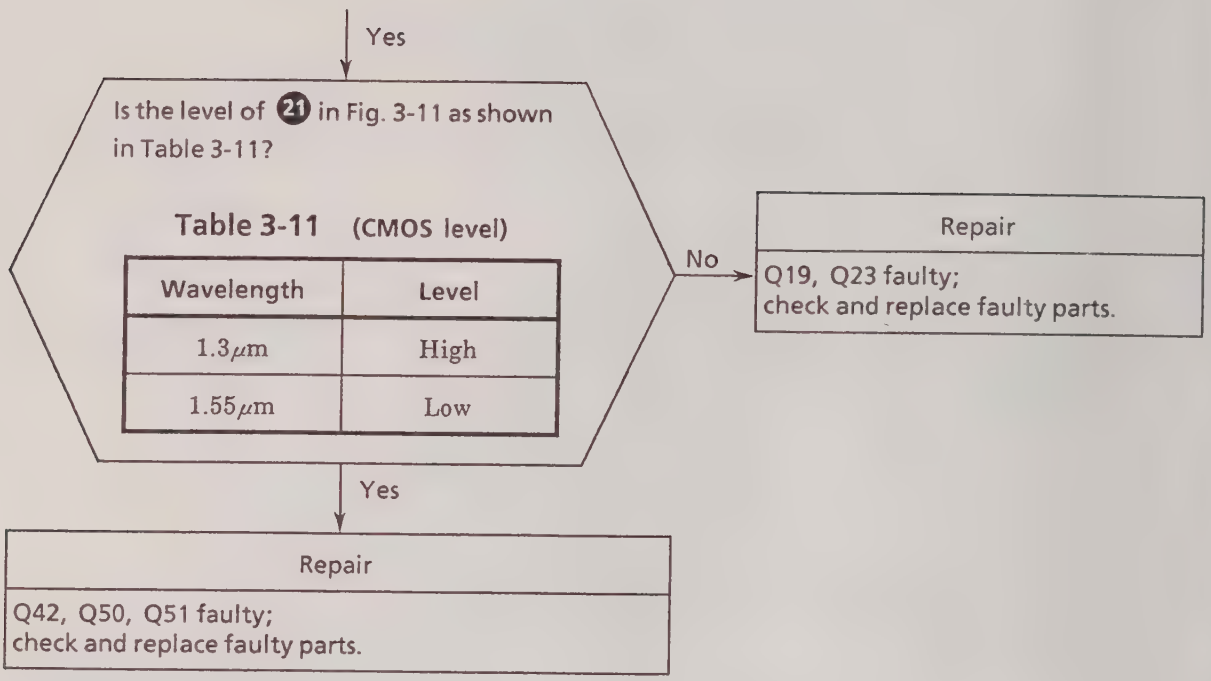
No →

Repair
Microswitches mounted on OUTPUT lid, Q42 is faulty; check and replace faulty parts.

Yes ↓

Troubleshoot and Repair
MW9040B-A1 MAIN CPU (Refer to MW9040B Service Manual.)


© (Failure in wavelength setting)
Is the level of 18 in Fig. 3-11 as shown in Table 3-8?
Table 3-8 (CMOS level)
Wavelength | Level
1.3μm | High
1.55μm | Low
No
Repair
Q9 faulty;
check and replace faulty parts.
Yes
Is the level of 19 in Fig. 3-11 as shown in Table 3-9?
Table 3-9
Wavelength | 19 Level
1.3μm | −12 V
1.55μm | 0 V
No
Troubleshoot and Repair
A2 AMP PC Board
Yes
Is the level of 20 in Fig. 3-11 as shown in Table 3-10?
Table 3-10
Wavelength | 20 Level
1.3μm | +12 V
1.55μm | +3 V
No
Troubleshoot and Repair
A3 AO DRIVER PC board
Yes


Yes
Is the level of 21 in Fig. 3-11 as shown in Table 3-11?
Table 3-11 (CMOS level)
Wavelength
Level
1.3μm
High
1.55μm
Low
No
Repair
Q19, Q23 faulty;
check and replace faulty parts.
Yes
Repair
Q42, Q50, Q51 faulty;
check and replace faulty parts.

Ⓓ (Failure in pulse width setting)

Set the MW9040B as shown below.
DR = 100 km, PW = 4 μs

Waveform of 22 (NLDTG) in Fig. 3-11 is as shown in Fig. 3-6?

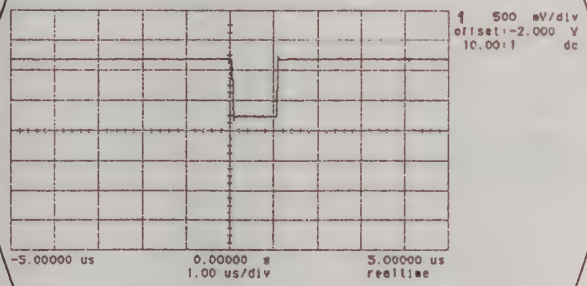


Fig. 3-6 Waveform 22

No → Troubleshoot and Repair: MW9040B-A3 MEAS.CPU PC Board (Refer to MW9040B Service Manual.)

Yes

Waveform of 23 (NLDTG1) in Fig. 3-11 is as shown in Fig. 3-7?

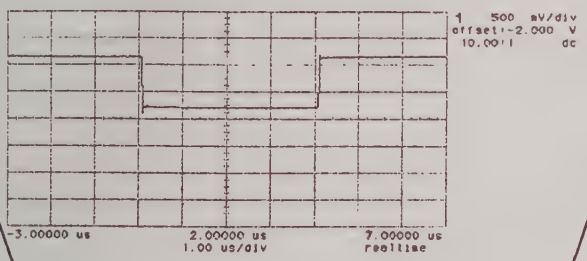


Fig. 3-7 Waveform 23

No → Repair: Q72, Q73, Q75, Q84 Q66, K5 faulty

Yes

Waveform of ㉔ (PW) and ㉕ (NPW) in Fig. 3-11 are as shown in Fig. 3-8?

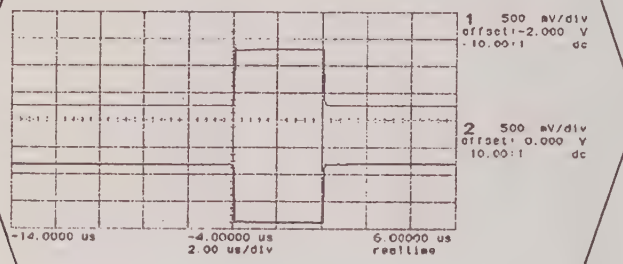


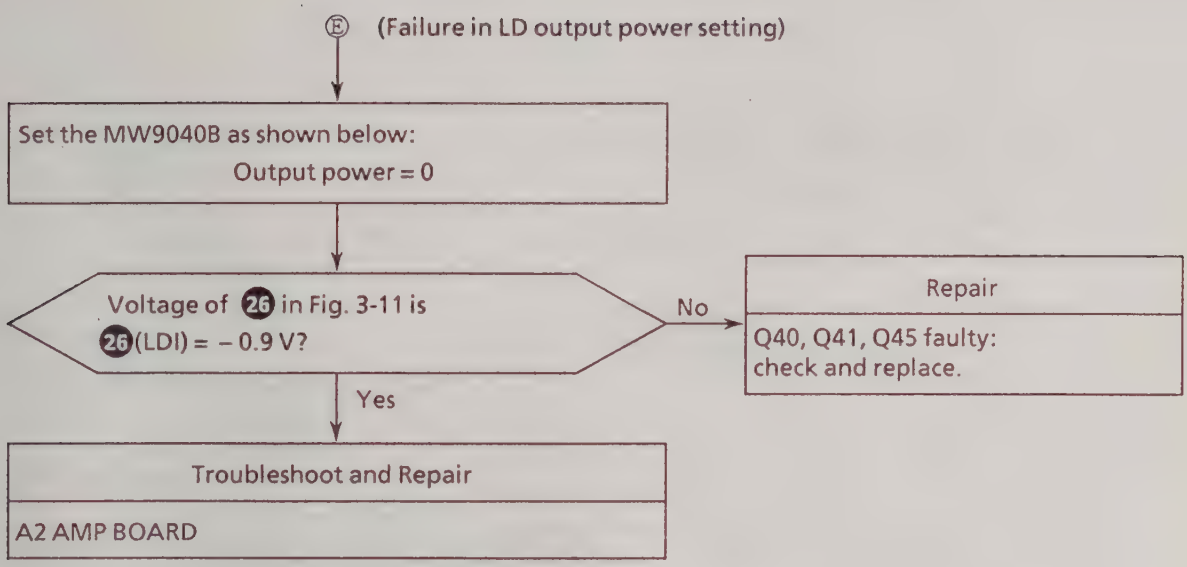
Fig. 3-8 Waveforms ㉔ and ㉕

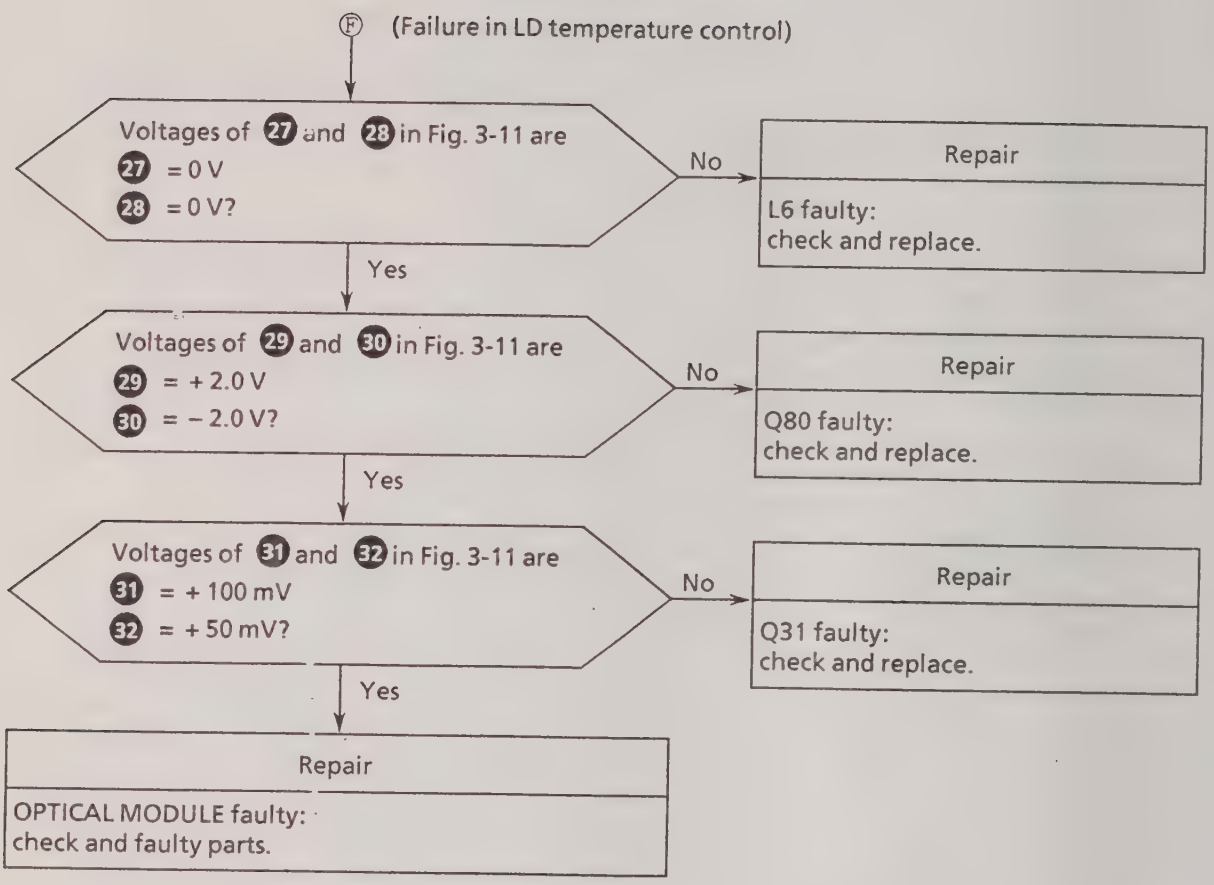
No

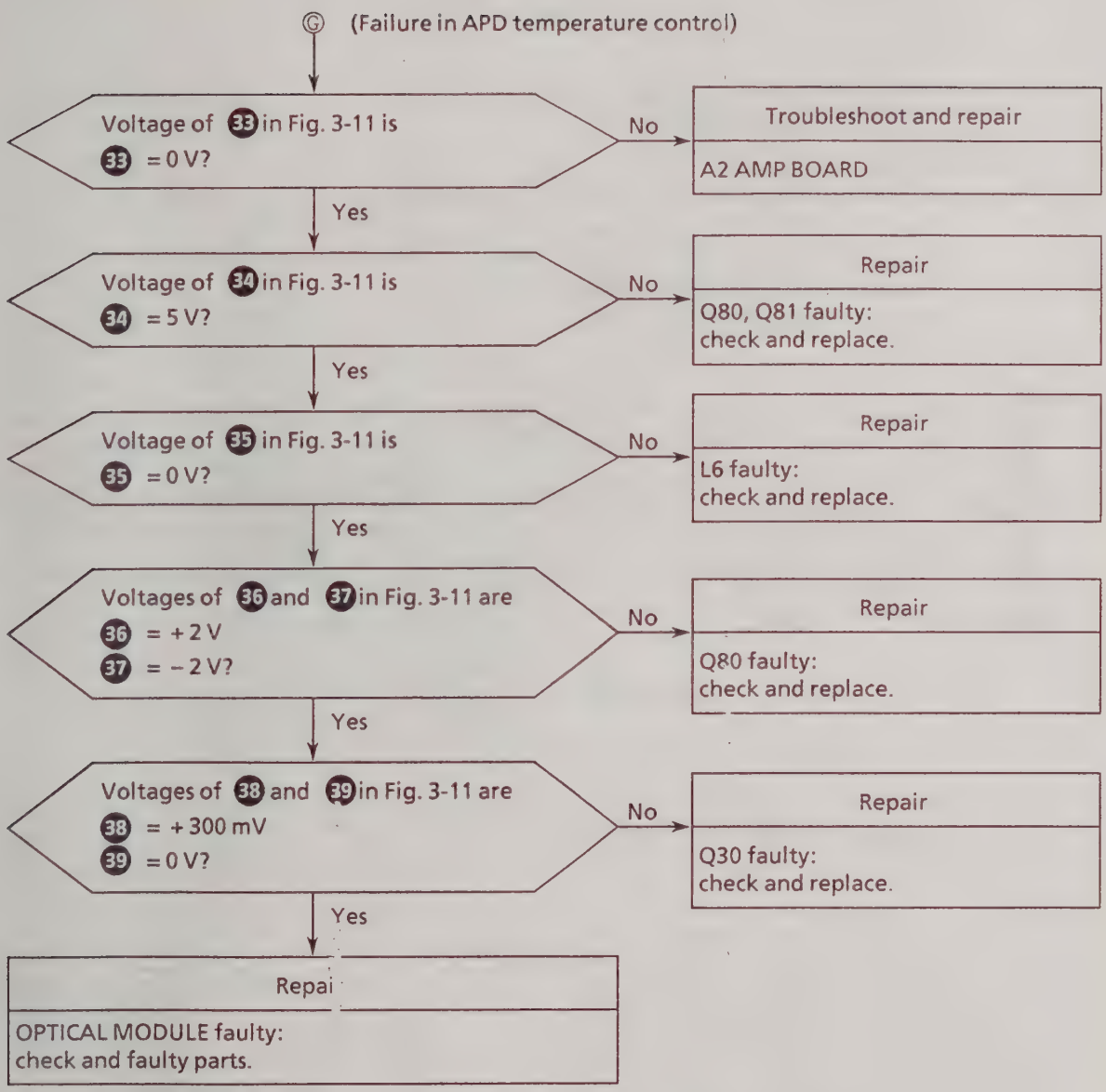
Repair
Q70, Q71 faulty; check and replace faulty parts.

Yes

Troubleshoot and Repair
A2 AMP BOARD


Ⓔ (Failure in LD output power setting)
Set the MW9040B as shown below:
Output power = 0
Voltage of 26 in Fig. 3-11 is
26 (LDI) = – 0.9 V?
No
Repair
Q40, Q41, Q45 faulty:
check and replace.
Yes
Troubleshoot and Repair
A2 AMP BOARD


Ⓕ (Failure in LD temperature control)
Voltages of 27 and 28 in Fig. 3-11 are
27 = 0 V
28 = 0 V?
No
Repair
L6 faulty:
check and replace.
Yes
Voltages of 29 and 30 in Fig. 3-11 are
29 = + 2.0 V
30 = − 2.0 V?
No
Repair
Q80 faulty:
check and replace.
Yes
Voltages of 31 and 32 in Fig. 3-11 are
31 = + 100 mV
32 = + 50 mV?
No
Repair
Q31 faulty:
check and replace.
Yes
Repair
OPTICAL MODULE faulty:
check and faulty parts.


Ⓖ (Failure in APD temperature control)
Voltage of 33 in Fig. 3-11 is 33 = 0 V?
No
Troubleshoot and repair
A2 AMP BOARD
Yes
Voltage of 34 in Fig. 3-11 is 34 = 5 V?
No
Repair
Q80, Q81 faulty: check and replace.
Yes
Voltage of 35 in Fig. 3-11 is 35 = 0 V?
No
Repair
L6 faulty: check and replace.
Yes
Voltages of 36 and 37 in Fig. 3-11 are 36 = +2 V 37 = −2 V?
No
Repair
Q80 faulty: check and replace.
Yes
Voltages of 38 and 39 in Fig. 3-11 are 38 = +300 mV 39 = 0 V?
No
Repair
Q30 faulty: check and replace.
Yes
Repai
OPTICAL MODULE faulty: check and faulty parts.

Ⓗ (Failure in Mask setting)

Set the MW9040B as shown below:
DR = 100 km
mask ALL Clear

Waveform of 40 (HMASK) in Fig. 3-11 is as shown in Fig. 3-9?

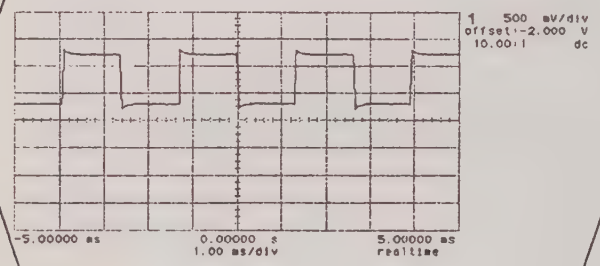


Fig. 3-9 Waveform 40

No → Troubleshoot: MW9040B-A3 MEAS.CPU PC Boards (Refer to MW9040B Service Manual.)

Yes

Waveform of 41 (OSW TRG) in Fig. 3-11 is as shown in Fig. 3-10?

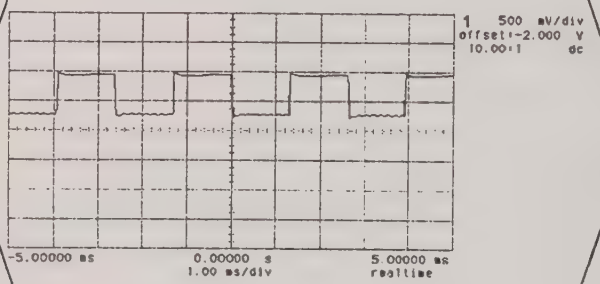


Fig. 3-10 Waveform 41

No → Repair: Q63, Q65, K2, K3 faulty: check and replace.

Yes

Troubleshoot and Repair: A3 A/O DRIVER

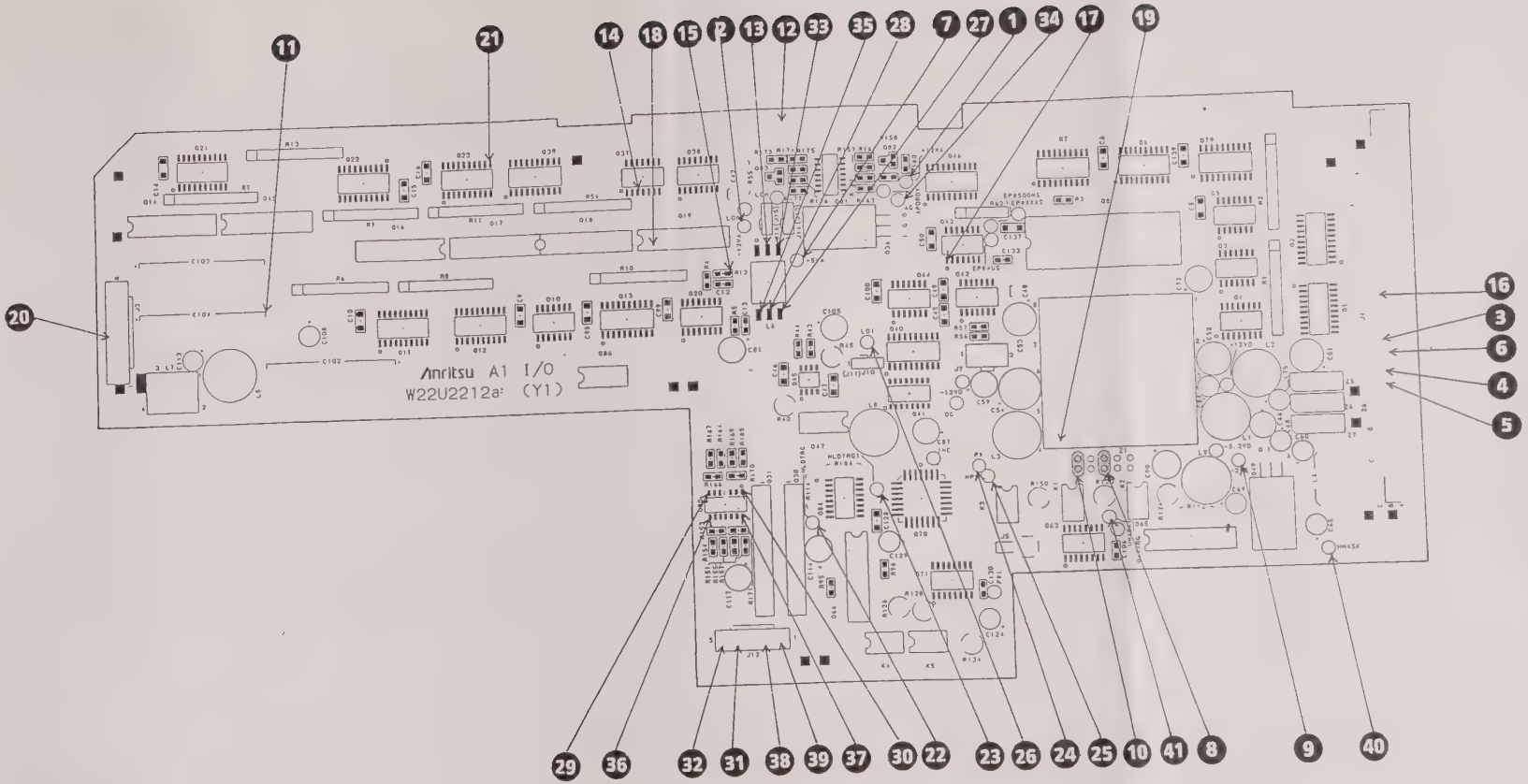


Fig. 3-11 A1 I/O PC Board Parts Layout 2

3.6.3 A2 AMP PC board 3

(1) Circuit description

This board incorporates a temperature monitor circuit for LD and APD, LD drive circuit, a circuit to convert APD output into voltage, a circuit to amplify its weak signal, a circuit to control the amplifier circuit offset, a DC/DC converter for APD bias voltage, and a bias voltage control circuit.

The temperature monitor circuit for LD and APD gains its input from J5 of the thermistor mounted on LD and APD. The signal obtained is converted into a voltage by Q62 OP (operational) amplifier, and the resultant voltage is output to the A1 I/O PC board.

The LD drive circuit is composed of a waveform shaping circuit and a current amblification circuit. Waveforms are shaped with Q73 through Q80. The shaped waveform signals are current-driven by Q81 through Q84. For the MW0947B, a driving LD is selected by the K5 relay.

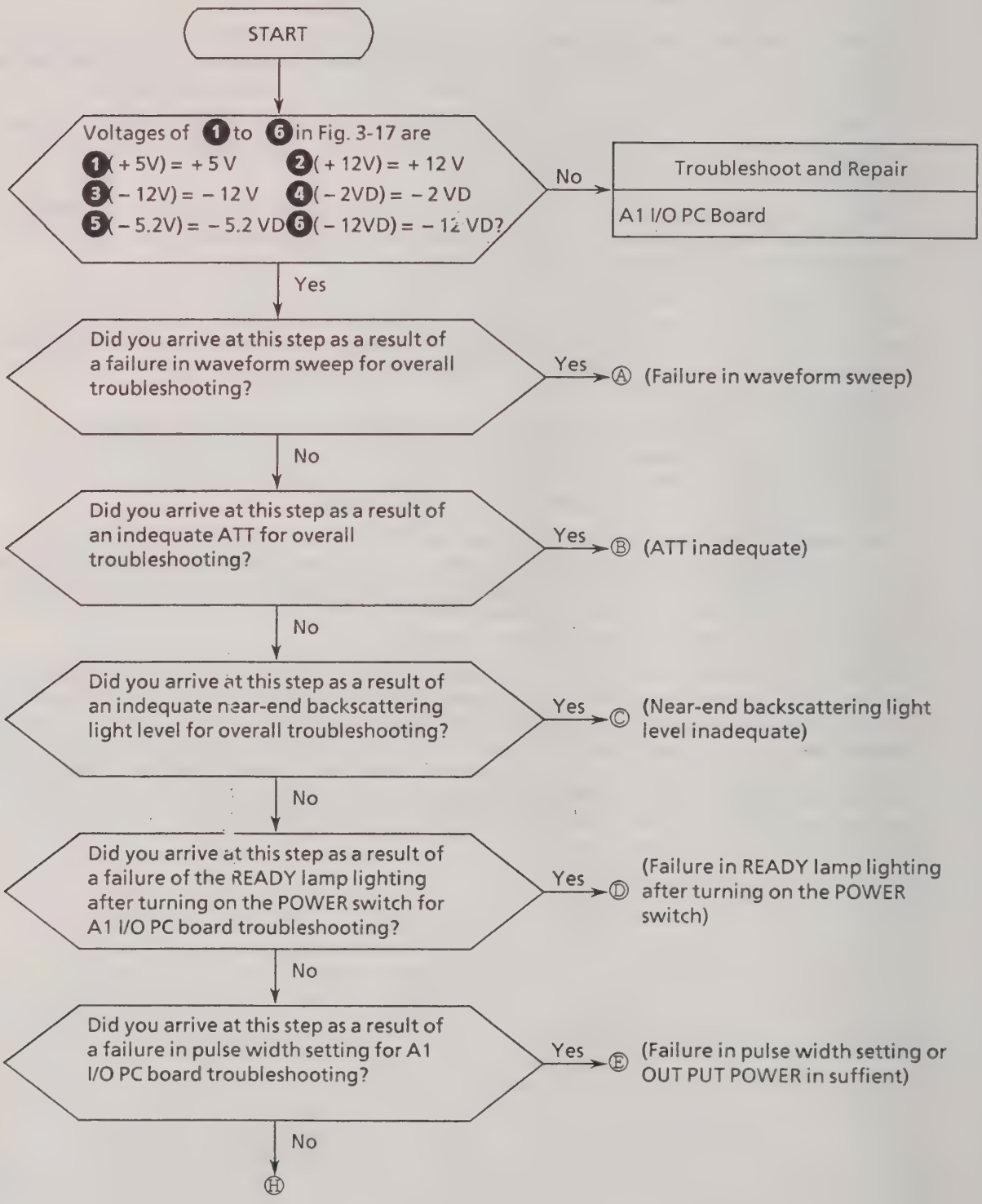
The APD output is terminated by resistors R2 and R3 and converted into a voltage, which is then amplified by the Q3 OP amplifier. Depending on the measuring conditions, the termination resistance of the APD is determined by changeover at relay K5. The signal amplified by the Q3 OP amplifier passes through the Q4 buffer amplifier and is fed to the attenuator composed of R7 to R18. This attenuator is switched over by relays K1 to K4.

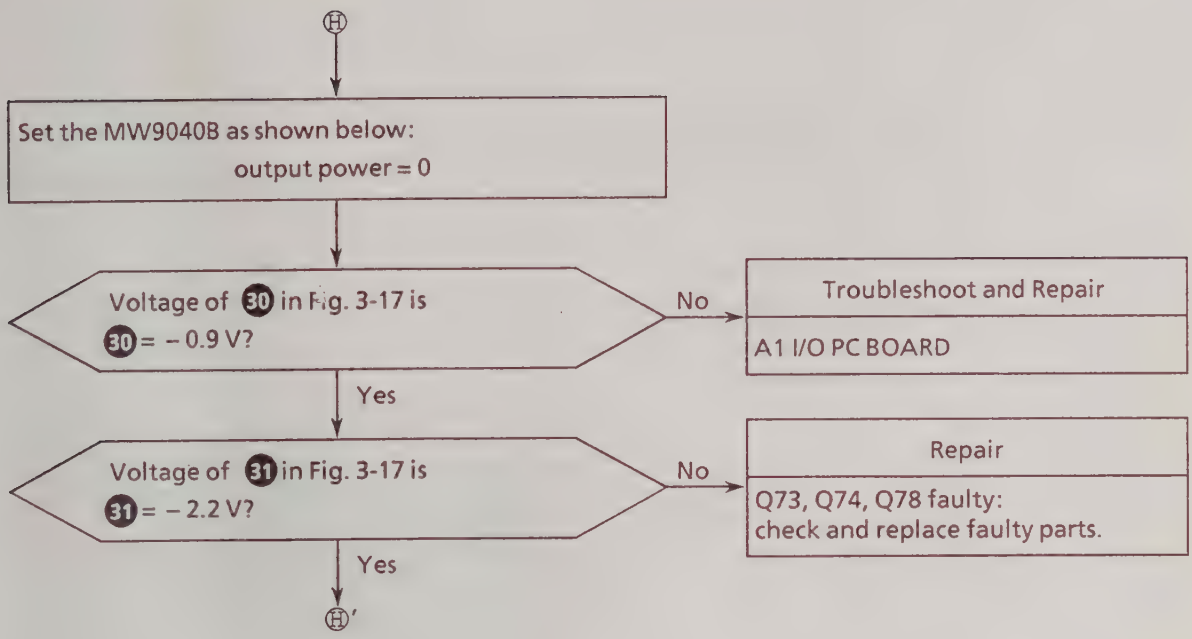
The attenuator output is further amplified at the OP amplifiers Q31 and Q33, and then passes through the buffer amplifier composed of Q35, Q36, Q38, Q39. This output is then entered into the MW9040B through J4. As it is necessary to suppress offset voltage variation for the AMP output signal, the latter stages of the attenuator is provided with offset control circuits.

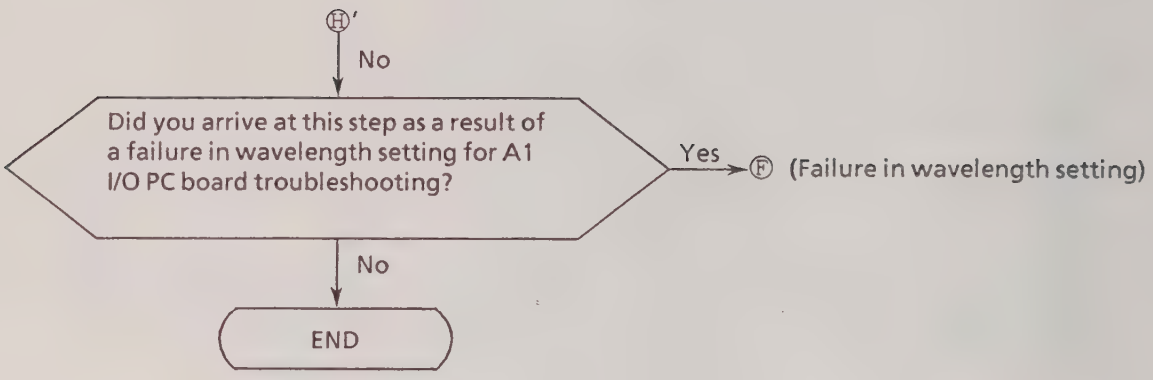
When the signal level output from the amplifier is detected by the MW9040B, the offset control circuit for the latter stage sends out a digital signal output to the I/O port Q70 and the digital signal is converted into an analog signal by the D/A converter Q21 and the OP amplifiers Q23 and Q25. This analog voltage signal is divided by R47 and R182, and sent into the OP amplifier Q31. In this manner the level of signal output from the amplifier block is maintained constant.

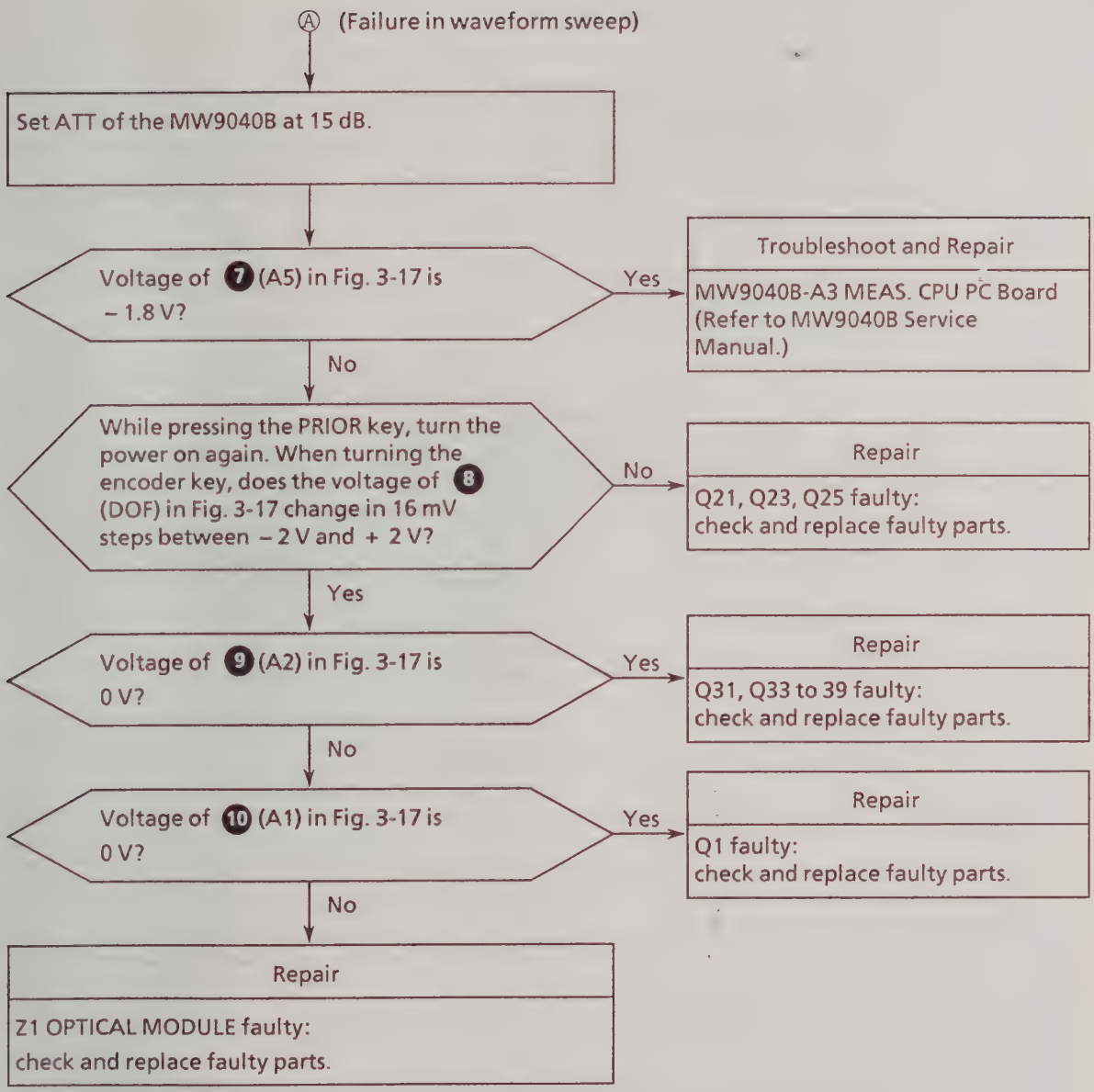
The DC/DC converter for APD bias is composed of transistors Q40 and Q42 and transformer T1. Thus a voltage of 12 V is raised as high as 140 volts. The higher AC voltage is then rectified by the diodes Q44 to Q47. Since the amplification factor of the APD can vary with temperature even though the bias voltage is maintained at a constant level, this factor is fixed by controlling the bias voltage on the APD temperature monitor. Therefore, the waveform level on the CRT can be maintained uniform even though ambient tempeature varies. Conversion of APD temperature monitor voltage is effected to maintain a constant amplification factor by the OP amplifier Q51. The APD bias voltage is controlled by the OP amplifier Q51 and the transistor Q48.

(2) Troubleshooting and repair


START
Voltages of ❶ to ❻ in Fig. 3-17 are
❶ (+5V) = +5 V
❷ (+12V) = +12 V
❸ (−12V) = −12 V
❹ (−2VD) = −2 VD
❺ (−5.2V) = −5.2 VD
❻ (−12VD) = −12 VD?
No
Troubleshoot and Repair
A1 I/O PC Board
Yes
Did you arrive at this step as a result of a failure in waveform sweep for overall troubleshooting?
Yes
Ⓐ (Failure in waveform sweep)
No
Did you arrive at this step as a result of an indequate ATT for overall troubleshooting?
Yes
Ⓑ (ATT inadequate)
No
Did you arrive at this step as a result of an indequate near-end backscattering light level for overall troubleshooting?
Yes
Ⓒ (Near-end backscattering light level inadequate)
No
Did you arrive at this step as a result of a failure of the READY lamp lighting after turning on the POWER switch for A1 I/O PC board troubleshooting?
Yes
Ⓓ (Failure in READY lamp lighting after turning on the POWER switch)
No
Did you arrive at this step as a result of a failure in pulse width setting for A1 I/O PC board troubleshooting?
Yes
Ⓔ (Failure in pulse width setting or OUT PUT POWER in suffient)
No
Ⓗ


Ⓗ
Set the MW9040B as shown below:
output power = 0
Voltage of 30 in Fig. 3-17 is
30 = – 0.9 V?
No
Troubleshoot and Repair
A1 I/O PC BOARD
Yes
Voltage of 31 in Fig. 3-17 is
31 = – 2.2 V?
No
Repair
Q73, Q74, Q78 faulty:
check and replace faulty parts.
Yes
Ⓗ′


Ⓗ'
No
Did you arrive at this step as a result of a failure in wavelength setting for A1 I/O PC board troubleshooting?
Yes
Ⓕ (Failure in wavelength setting)
No
END


Ⓐ (Failure in waveform sweep)
Set ATT of the MW9040B at 15 dB.
Voltage of ❼ (A5) in Fig. 3-17 is − 1.8 V?
Yes
Troubleshoot and Repair
MW9040B-A3 MEAS. CPU PC Board (Refer to MW9040B Service Manual.)
No
While pressing the PRIOR key, turn the power on again. When turning the encoder key, does the voltage of ❽ (DOF) in Fig. 3-17 change in 16 mV steps between − 2 V and + 2 V?
No
Repair
Q21, Q23, Q25 faulty: check and replace faulty parts.
Yes
Voltage of ❾ (A2) in Fig. 3-17 is 0 V?
Yes
Repair
Q31, Q33 to 39 faulty: check and replace faulty parts.
No
Voltage of ❿ (A1) in Fig. 3-17 is 0 V?
Yes
Repair
Q1 faulty: check and replace faulty parts.
No
Repair
Z1 OPTICAL MODULE faulty: check and replace faulty parts.

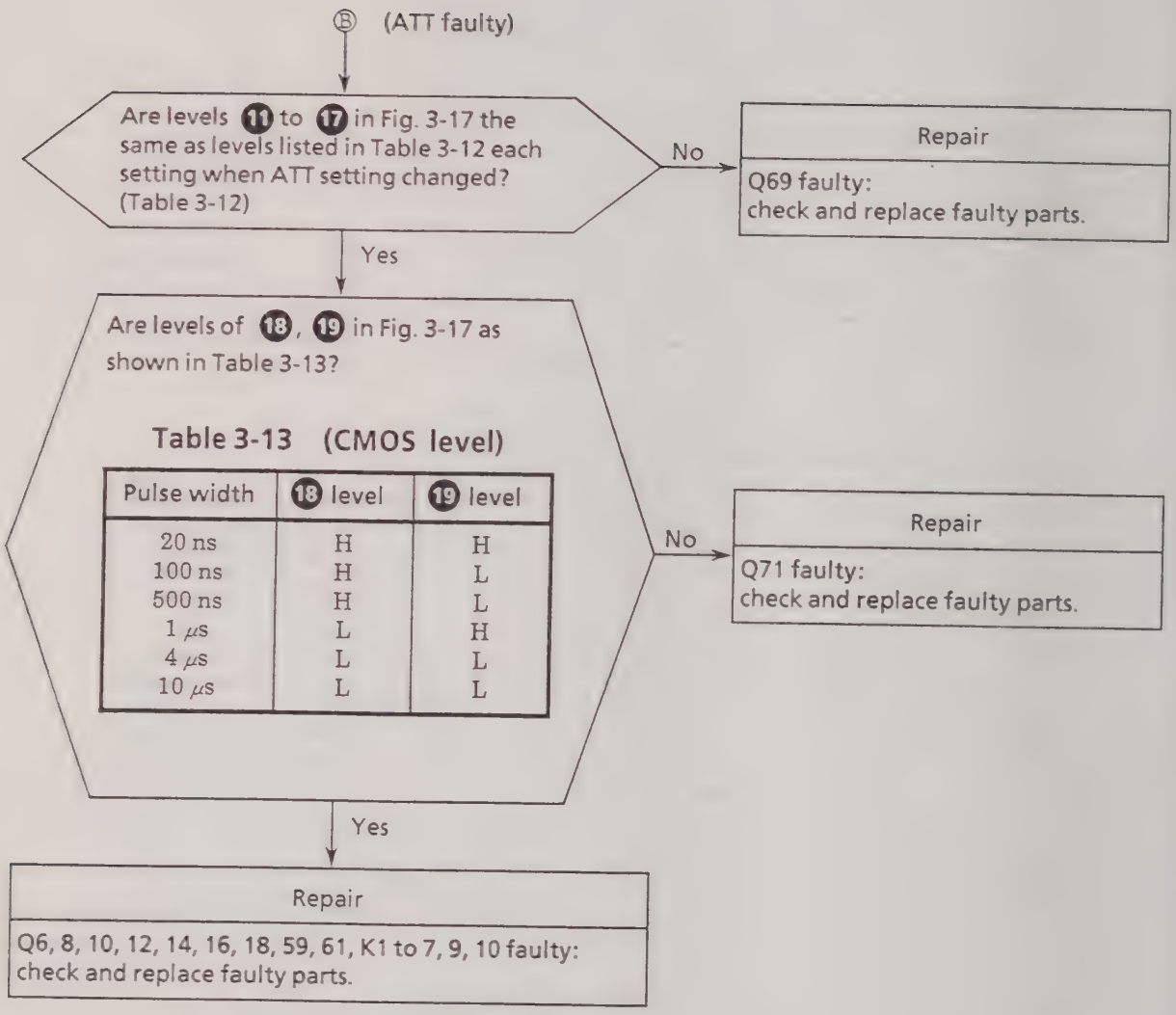

Ⓑ (ATT faulty)
Are levels 11 to 17 in Fig. 3-17 the same as levels listed in Table 3-12 each setting when ATT setting changed? (Table 3-12)
No
Repair
Q69 faulty:
check and replace faulty parts.
Yes
Are levels of 18, 19 in Fig. 3-17 as shown in Table 3-13?
Table 3-13 (CMOS level)
Pulse width | 18 level | 19 level
20 ns | H | H
100 ns | H | L
500 ns | H | L
1 μs | L | H
4 μs | L | L
10 μs | L | L
No
Repair
Q71 faulty:
check and replace faulty parts.
Yes
Repair
Q6, 8, 10, 12, 14, 16, 18, 59, 61, K1 to 7, 9, 10 faulty:
check and replace faulty parts.

Table 3-12 ATT and Set Level (CMOS)

Pulse width (s)	Test Point	Att. (dB)																		
		0	1.25	2.5	3.75	5.0	6.25	7.5	8.75	10.0	11.25	12.5	13.75	15.0	16.25	17.5	18.75	20.0	21.25	22.5	23.75
20 n	⑪ (ATT 0)	H	H	H	H	H	H	H	H	H	H	H	H	H							
	⑫ (1)	L	H	L	H	L	H	L	H	L	H	L	H	L							
	⑬ (2)	L	L	H	H	L	L	H	H	L	L	H	H	L							
	⑭ (3)	L	L	L	L	H	H	H	H	L	L	L	L	H							
	⑮ (4)	L	L	L	L	L	L	L	L	H	H	H	H	H							
	⑯ (5)	H	H	H	H	H	H	H	H	H	H	H	H	H							
	⑰ (6)	L	L	L	L	L	L	L	L	L	L	L	L	L							
100 n	⑪ (ATT 0)	H	H	H	H	H	H	H	H	H	H	H	H	H							
	⑫ (1)	L	L	H	L	H	L	H	L	H	L	H	L	H							
	⑬ (2)	L	L	L	H	H	L	L	H	H	L	L	H	H							
	⑭ (3)	L	L	L	L	L	H	H	H	H	L	L	L	L							
	⑮ (4)	L	L	L	L	L	L	L	L	L	H	H	H	H							
	⑯ (5)	H	L	L	L	L	L	L	L	L	L	L	L	L							
	⑰ (6)	L	L	L	L	L	L	L	L	L	L	L	L	L							
500 n	⑪ (ATT 0)	H	H	H	H	H	H	H	H	H	H	H	H	H							
	⑫ (1)	L	L	H	L	L	H	L	H	L	H	L	H	L							
	⑬ (2)	L	L	L	H	L	L	H	H	L	L	H	H	L							
	⑭ (3)	L	L	L	L	L	L	L	L	H	H	H	H	L							
	⑮ (4)	L	L	L	L	L	L	L	L	L	L	L	L	H							
	⑯ (5)	H	L	L	L	L	L	L	L	L	L	L	L	L							
	⑰ (6)	L	L	L	L	H	H	H	H	H	H	H	H	H							
1 μ	⑪ (ATT 0)	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H			
	⑫ (1)	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L			
	⑬ (2)	L	L	H	H	L	L	H	H	L	L	H	H	L	L	H	H	L			
	⑭ (3)	L	L	L	L	L	L	L	L	H	H	H	H	L	L	L	L	H			
	⑮ (4)	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H			
	⑯ (5)	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L	L			
	⑰ (6)	L	L	L	L	H	H	H	H	H	H	H	H	H	H	H	H	H			
4 μ	⑪ (ATT 0)	L	L	L	L	L	L	L	H	H	H	H	H	H	H	H	H	H	H	H	H
	⑫ (1)	L	H	L	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L
	⑬ (2)	L	L	H	L	L	H	H	L	L	H	H	L	L	H	H	L	L	H	H	L
10 μ	⑭ (3)	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	L	L	L	L	H
	⑮ (4)	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H
	⑯ (5)	L	L	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
	⑰ (6)	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L

© (Near-end backscattering light level in adequate)

Is the voltage of ⑳ (APDB) in Fig. 3-17 the voltage of APD bias on the surface of the optical module?

Yes → Troubleshoot and Repair: A3 AO DRIVER PC BOARD

No

Is the voltage difference more than 140 V between ㉑ and ㉒ in Fig. 3-17?

No → Repair: Q48 to 52, 54, 56 faulty: check and replace faulty parts.

No

Waveform of ㉓ in Fig. 3-17 is as shown in Fig. 3-12?

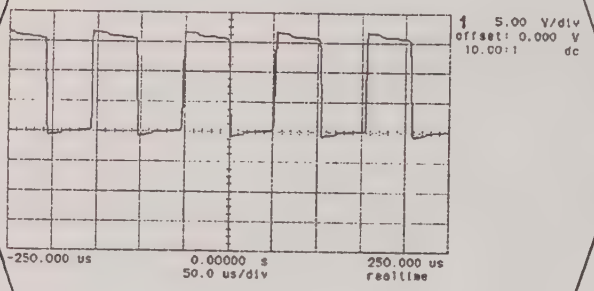


Fig. 3-12 Waveform ㉓

Yes → Repair: Q44 to 47 faulty: check and replace faulty parts.

No

Repair: Q40 to Q43, T1 faulty: check and replace faulty parts.

Ⓔ (Failure in pulse width setting)

With the LD turned off, move the short-pin J22 from Pins 1 and 2 of J23 to Pins 2 and 3 of J23.
Then turn on the LD.
Set DR and PW as follows.
DW = 100 km
PW = 4 μs

Is the pulse width of ㉘ (LDL) in Fig. 3-17 equivalent with the preset one as shown in Fig. 3-13?

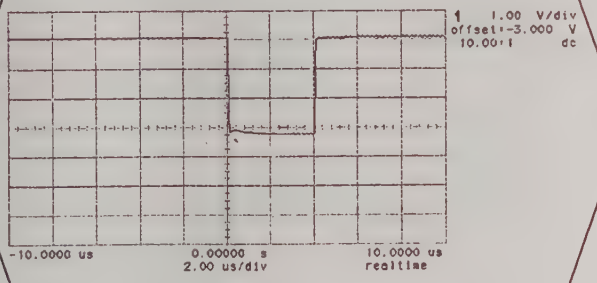


Fig. 3-13 Waveform ㉘

Yes → Troubleshoot and Repair
Z1 OPTICAL MODULE

No

Waveform of ㉙ in Fig. 3-17 is as shown in Fig. 3-14?

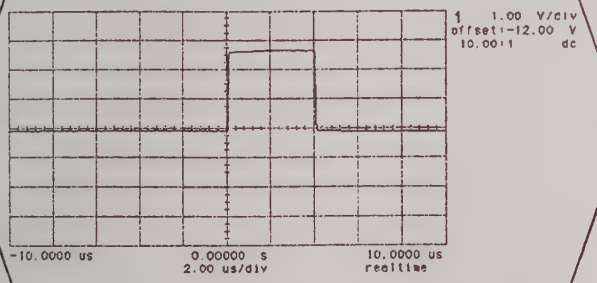
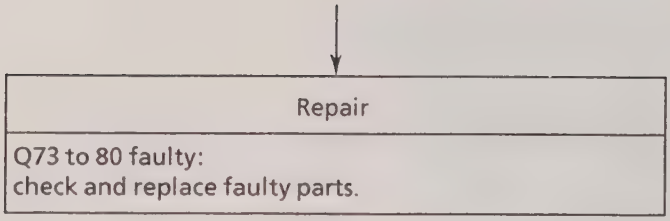
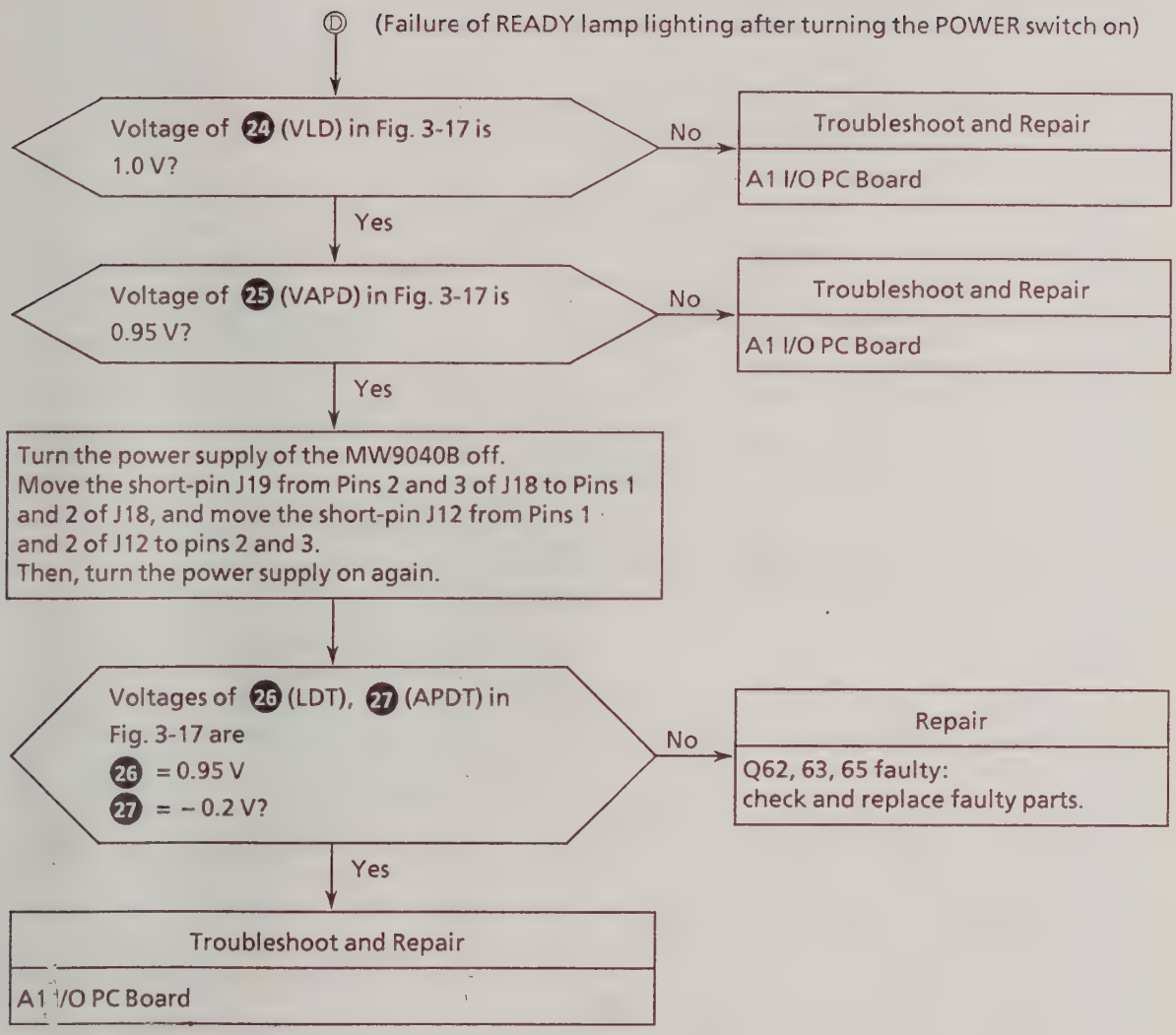


Fig. 3-14 Waveform ㉙

No → Repair
Q81 to 84 faulty:
check and replace faulty parts.

Yes


Repair
Q73 to 80 faulty:
check and replace faulty parts.


Ⓓ (Failure of READY lamp lighting after turning the POWER switch on)
Voltage of 24 (VLD) in Fig. 3-17 is 1.0 V?
No
Troubleshoot and Repair
A1 I/O PC Board
Yes
Voltage of 25 (VAPD) in Fig. 3-17 is 0.95 V?
No
Troubleshoot and Repair
A1 I/O PC Board
Yes
Turn the power supply of the MW9040B off.
Move the short-pin J19 from Pins 2 and 3 of J18 to Pins 1 and 2 of J18, and move the short-pin J12 from Pins 1 and 2 of J12 to pins 2 and 3.
Then, turn the power supply on again.
Voltages of 26 (LDT), 27 (APDT) in Fig. 3-17 are
26 = 0.95 V
27 = – 0.2 V?
No
Repair
Q62, 63, 65 faulty:
check and replace faulty parts.
Yes
Troubleshoot and Repair
A1 I/O PC Board

Ⓕ (Failure in wavelength setting)

Is the level of (32) in Fig. 3-17 as shown in Table 3-14?

Table 3-14

Wavelength	(32) Level
1.31 μm	+12 V
1.55 μm	+3 V

No → Troubleshoot and Repair: A1 I/O PC BOARD

Is the waveform (33) in Fig. 3-17 as shown in Fig. 3-15 when the wavelength is 1.3 μm?

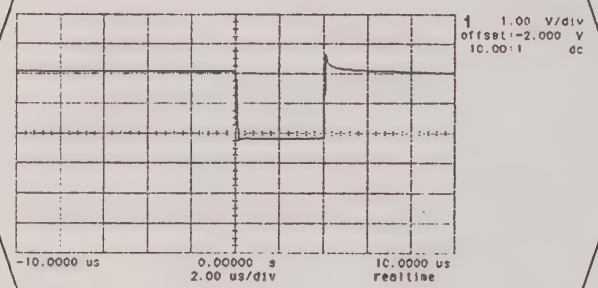


Fig. 3-15 Waveform (33)

No → Repair: Q85, 86, K11 faulty: check and replace faulty parts.

Yes

Is the waveform ㉞ in Fig. 3-17 as shown in Fig. 3-16 when the wavelength is 1.55 μm?

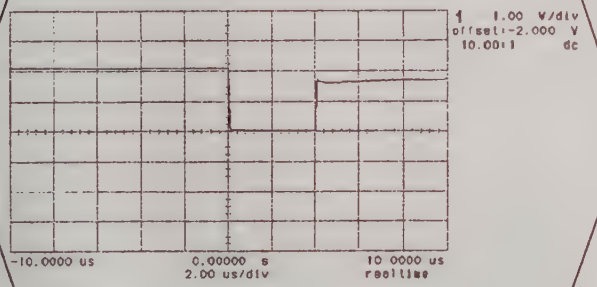


Fig. 3-16 Waveform ㉞

No

Repair
Q85, 86, K11 faulty: check and replace faulty parts.

Yes

Troubleshoot and Repair
Z1 OPTICAL MODULE

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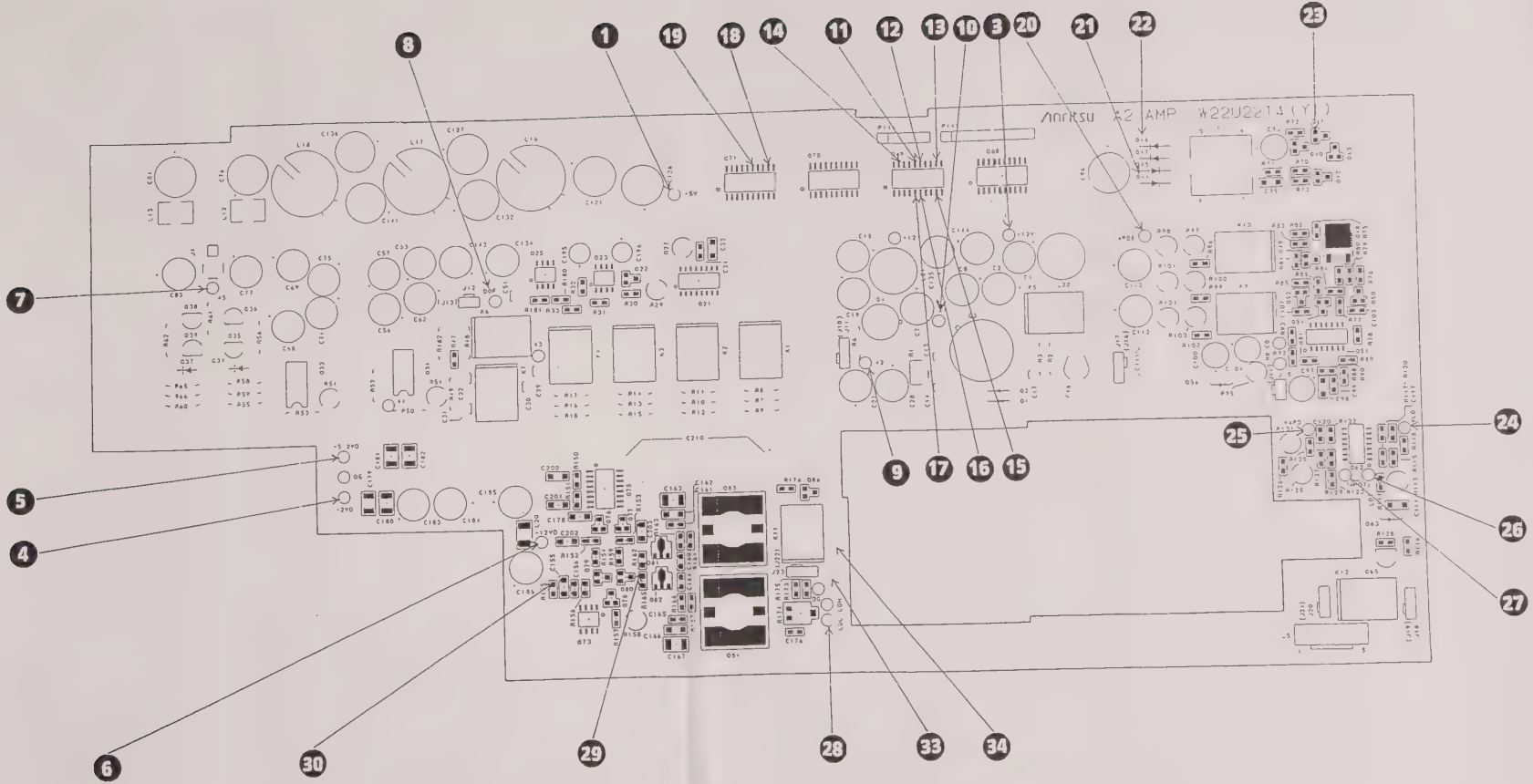


Fig. 3-17 A2 AMP PC Board Parts Layout **3**

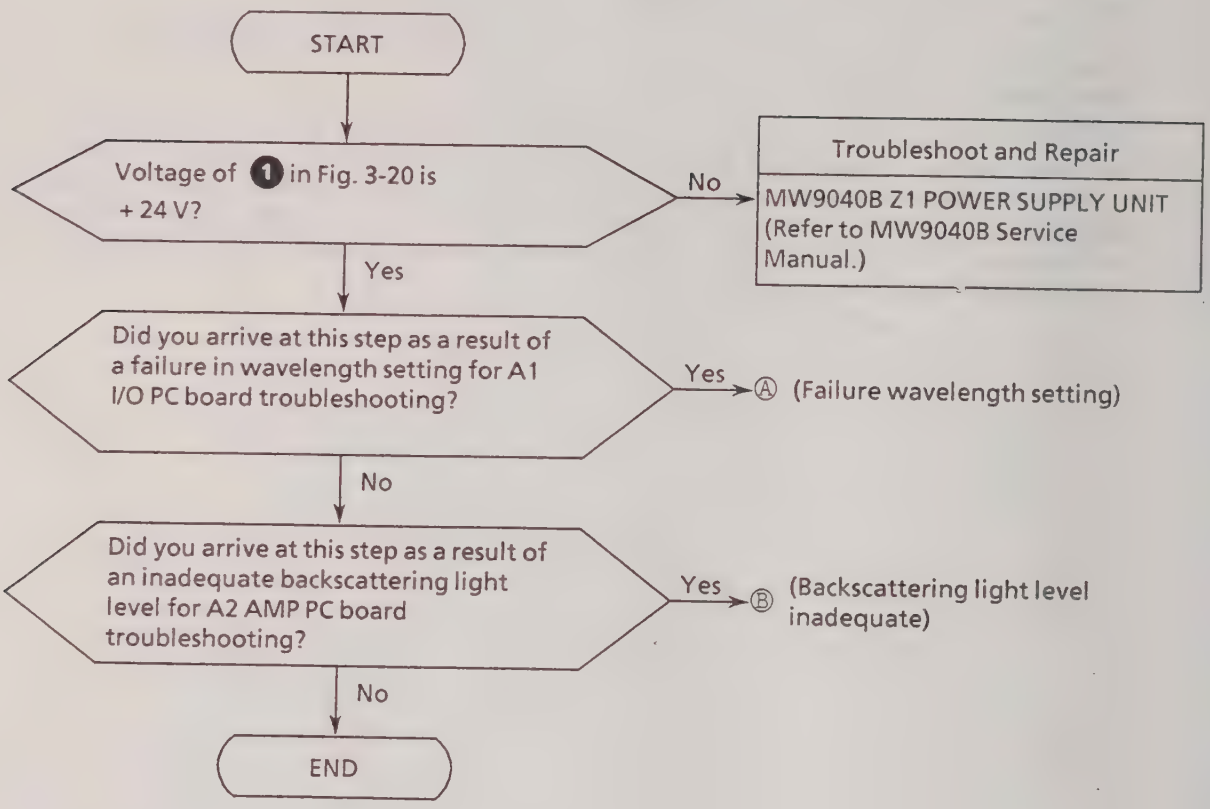
3.6.4 A3 AO DRIVER PC board 4

(1) Circuit description

This board contains circuits for the ON/OFF operation of the A/O switches based on the ECL-level timing signal from the MW9040B.

The output from an oscillator of Z2 or Z3 is switched on and off at the mixer Z1, in synchronization with the timing signal input from J2. The resultant signal is amplified by the amplifiers Q7 and Q8 and output to J3. This output is entered into the A/O switch via the A2 AMP PC board. The signal level is adjustable by the control of R12 and R13. If the wavelength is 1.3 μm, driving is affected at 120 MHz. If the wavelength is 1.55 μm, then driving is affected with an ultrasonic wave of 100.64 MHz. The frequency is changed by the K1 relay.

(2) Troubleshooting and repair


START
Voltage of ❶ in Fig. 3-20 is +24 V?
No
Troubleshoot and Repair
MW9040B Z1 POWER SUPPLY UNIT (Refer to MW9040B Service Manual.)
Yes
Did you arrive at this step as a result of a failure in wavelength setting for A1 I/O PC board troubleshooting?
Yes
Ⓐ (Failure wavelength setting)
No
Did you arrive at this step as a result of an inadequate backscattering light level for A2 AMP PC board troubleshooting?
Yes
Ⓑ (Backscattering light level inadequate)
No
END

Ⓐ (Failure in wavelength setting)

Is the oscillation frequency of ❷ in Fig. 3-20 as specified in Table 3-15 below?

Table 3-15 Oscillation frequency

Wavelength	Oscillation frequency of ❷
1.3 μm	120 MHz
1.55 μm	100.64 MHz

No →

Repair
K1, Z2, Z3 faulty: check and replace faulty parts.

Yes ↓

Troubleshoot and Repair
Z1 OPTICAL MODULE

Ⓑ (Backscattering light level inadequate)

Set the MW9040B as shown below:
DR = 50 km, H-SCALE = 5 dB/div

Waveform of ❸ in Fig. 3-20 is as shown in Fig. 3-18?

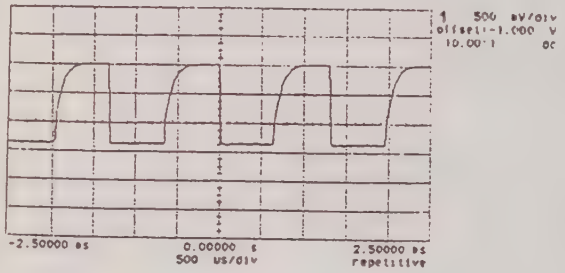


Fig. 3-18 Waveform ❸

No →

Troubleshoot and Repair
Q6 faulty; check and replace faulty parts. MW9040B-A3 MEAS.CPU PC board (Refer to MW9040B Service Manual.)

Yes ↓

The waveform amplitude (0-Peak) of ❷ in Fig. 3-20 is equivalent with the numeral described in the Z1 optical module? (See Fig. 3-19)

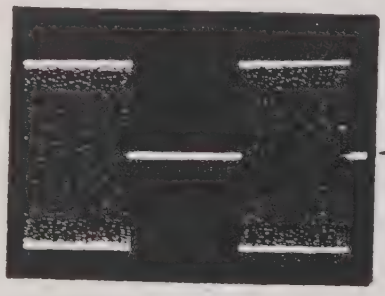


Fig. 3-19 Waveform ❷

No →

Repair
Z1, Q7, Q8 faulty: check and replace faulty parts.

Yes ↓

Troubleshoot and Repair
Z1 OPTICAL MODULE

SECTION 4
ADJUSTMENT

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(Blank)

4.1 Introduction

This section describes how to adjust the plug-in units.

When making adjustments, use the Extender Cable 1 to connect the plug-in unit to the MW9040B.

The plug-in unit adjustment points and contents are summarized in Table 4-1.

Table 4-1 Adjustment Points and Contents

No.	PC board	Adjustment point	Adjustment contets	Equipment
1	A2 AMP	A2-R1 R51 R54	Amplifier offset adjustment	Digital multimeter
		A2-R27 R29	Software offset compensation circuit adjustment	
		A2-R113 R125 R131	Temperature detection circuit adjustment	
2	A1 I/O	A1-R134 R128	LD drive pulse width adjustment	Oscilloscope
		A1-R124 R150	Mask width adjustment	
3	A3 A/O	A3-R12 R13	A/O switch driving voltage adjustment	Oscilloscope
4	A2 AMP	A2-R95 R100 R101 R103 R104 R97 R98	APD bias voltage adjustment	Digital multi-meter Oscilloscope

4.2 Actions before Turning Power on

4.2.1 A1 (I/O) PKG 2

Step	Procedure
1	Disconnect the connector from J3. (A/O driver power off)
2	Disconnect the connector from J12. (Peltier output off to LD/APD module)

4.2.2 A2 (AMP) PKG 3

Step	Procedure
1	Move the short pin J10 from Pins 1 and 2 to Pins 2 and 3. (Pre-amplifier output off)
2	Move the short pin J16 from Pins 1 and 2 to Pins 2 and 3. (APD bias off)
3	Move the short pin J19 from Pins 1 and 2 to Pins 2 and 3. (LD thermistor dummy resistor side)
4	Move the short pin J21 from Pins 1 and 2 to Pins 2 and 3. (APD thermistor dummy resistor side)
5	Move the short pin J22 from Pins 1 and 2 to Pins 2 and 3. (LD drive output dummy resistor side)
6	Disconnect the short pin J13. (Offset output off)
7	Turn R95, R97, R98, R100, R101, R103, and R104 fully counterclockwise. (APD bias minimum)

4.3 Power Source Voltage Check

4.3.1 A1 (I/O) PKG 2

+12 VA ..... AG (±0.5 V)
−12 VA ..... AG (±0.5 V)
+5 VA ..... AG (±0.2 V)

+12 VD ..... DG (±0.5 V)
−12 VD ..... DG (±0.5 V)
−5.2 VD ..... DG (±0.2 V)
+5 VD ..... DG (±0.2 V)
−2 VD ..... DG (±0.2 V)

4.3.2 A2 (AMP) PKG 3

+12 VA ..... AG (±0.5 V)
−12 VA ..... AG (±0.5 V)
+5 VA ..... AG (±0.2 V)

−12 VD ..... DG (±0.5 V)
−5.2 VD ..... DG (±0.2 V)
−2 VD ..... DG (±0.2 V)

4.4 A2 (AMP) PKG 3 Adjustment

4.4.1 AMP offset adjustment

Step	Procedure
1	Connect the MW0945B/0946B/0947B (hereinafter plug-in unit) to the MW9040B (hereinafter the main frame) with the extender cord.
2	Turn the main frame power on.
3	Set the main frame as follows. DR = 50 km PW = 1 μs ATT = 0 dB
4	Connect the probe to the test pin A2 and adjust the voltage to 0 ± 1 mV with R1.
5	Move the jumper switch of J10 from Pins 2 and 3 to Pins 1 and 2.
6	Connect the probe to the test pin A4 and adjust the voltage to 0 ± 20 mV with R51.
7	Connect the probe to the test pin A5 and adjust the voltage to 0 ± 50 mV with R54.
8	Turn the main frame power off.

4.4.2 Offset compensation circuit adjustment through software

Step	Procedure
1	Connect the plug-in unit to the main frame with the extender cord.
2	While pressing the PRIOR key, turn the power on.
3	Connect the digital voltage meter to the test pin DOF, and adjust values with each VRs as follows.

Offset value	Adjusting VR	Setting value
7F	R29	0 ± 0.1 V
FF	R27	2 ± 0.01 V
00	R27	−2 ± 0.01 V

Step	Procedure
4	Connect the jumper to J13.

4.4.3 LD/APD module temperature detection circuit adjustment

Step	Procedure
1	Connect the plug-in unit to the main frame with the extender corde.
2	Turn the main frame power on.
3	Connect the digital voltage meter to the test pin VLD and adjust the voltage to 0±10 mV with R113.
4	Connect the digital voltage meter to the test pin APDT and adjust the voltage to 0.95±0.01 V with R125.
5	Connect the digital voltage meter to the test pin VAPD and adjust the voltage to 0±10 mV with R131.
6	Turn the main frame power off.
7	Move the short pin J19 from Pins 2 and 3 to Pins 1 and 2.
8	Move the short pin J21 from Pins 2 and 3 to Pins 1 and 2.
9	Connect the connector to the short pin J12 in the A1 (AMP) PKG.
10	Turn the main frame power on.
11	Connect the probe to the test pin VLD and verify that the voltage is within 0±0.2 V.
12	Connect the probe to the test pin VAPD and verify that the voltage is within 0±0.2 V.
13	Turn the main frame power off.

4.5 A1 (I/O) PKG 2 Adjustment

4.5.1 LD drive pulse width adjustment

Step	Procedure
1	Connect the plug-in unit to the extender cord.
2	Turn the main frame power on.
3	Set the main frame as follows. DR = 100 km PW = 4 μs
4	Connect the optical fiber (hereinafter the fiber) to the plug-in unit and turn the LD on.
5	Connect the probe to the test pin PW and adjust the pulse width to 4 μs with R128.
6	Turn the main frame power off.

4.5.2 Mask width adjustment

Step	Procedure
1	Connect the plug-in unit to the main frame with the extender cord.
2	Turn the main frame power on.
3	Set the main frames follows. DR = 100 km PW = 4 μs
4	Connect the probe to the test pin UMASK and adjust the mask width (pulse) to 5 μs $^{+100\ \text{ns}}_{-0}$ with R150.*
5	Change the main frame setting as follows. DR = 100 km PW = 500 ns
6	Connect the synchroscope to the test pin and adjust the mask width (pulse) to 720 ns $^{+80\ \text{ns}}_{-0}$.*
7	Turn the main frame power off.

Note: * A PW signal at A1 (I/O) is used as a trigger signal.

4.5.3 LD-DR current adjustment

Step	Procedure
1	Connect the plug-in unit to the main frame with extender cord.
2	Turn the main frame power on.
3	Set the main frame as follows. DR = 100 km PW = 4 μs ATT = 0 dB
4	Connect the fiber to the plug-in unit and turn the LD on.
5	Connect the probe to the test pin LDI and adjust the voltage to 3 V $\pm$ 0.1 V with R45.
6	Connect the probe to the test pin LDI in the A2 (AMP) PKG and adjust the voltage to -4.7 V with R158.
7	Turn the LD off.
8	Turn the main power off.
9	Move the short pin J22 in the A2 (AMP) PKG from Pins 2 and 3 to Pins 1 and 2.

4.6 A3 (A/O DR) PKG 4 Adjustment

Step	Procedure
1	Connect the plug-in unit to the main frame with the extender cord.
2	Connect the connector from J1 in the A3 (A/O DR) PKG to J3 in the A1 (I/O).
3	Disconnect the connector from J2 in the A3 (A/O DR) PKG.
4	Connect the oscilloscope to J2 in the A3 (A/O DR) PKG through the 2.0 dB pad (50 Ω termination).
5	Turn the main frame power on.
6	Adjust to the voltage described on the optical module with R12 (1.31 μm side) and R13 (1.55 μm side).
7	Verify that there are no distortions in the burst waveforms for both wavelengths.
8	Turn the main frame power off.

4.7 APD Bias Adjustment · A2 (AMP) PKG 3

Step	Procedure
1	Connect the plug-in unit to the main frame with the extender cord.
2	Turn the main frame power on.
3	Connect the digital voltage meter to the test pin MB and adjust the voltage to 6.5 V ± 0.1 V with R95.
4	Set the main frame as follows. DR = 50 km PW = 1 μs ATT = 11.25 dB
5	Turn the main frame power off.
6	Move the short pin J16 from Pins 2 and 3 to Pins 1 and 2.
7	Turn the main frame power on.
8	Connect the fiber to the plug-in unit.
9	Connect the synchroscope to the test pin A2 and the digital voltage meter to the test pin APDB.
10	If the output waveform exceeds 1 volt, move the connection part of the optical connector and adjust the output at the test pin A2 to approximately 1 volt.
11	Turn R100 clockwise slowly and set to the voltage of the moment when the droop of the output waveform at the test pin A2 goes off. <M = 1 adjustment>
12	After connecting the fiber, adjust the back scattered level so that it increases by 2.38 dB with R100 (coarse) and R101 (fine). <M = 3>
13	Set the ATT of the main frame to 5 dB and adjust the fiber connection part so that the back scattered level is not saturated.* If the level is not saturated, the adjustment is not necessary.
14	When setting the ATT of the main frame to 3.75 dB, adjust the level so that it increases 1.25 dB on the CRT with R103 (coarse) and R104 (fine). <M = 30>
15	Change the main frame setting as follows. DR = 100 km PW = 4 μs ATT = 3.75 dB
16	Adjust the fiber connection part as the back scattered level is not saturated.* If the level is not saturated, the adjustment is not necessary.
17	When setting the ATT of the main frame, adjust the level so that it increases by 1.25 dB on the CRT with R97 (coarse) and R98 (fine). <M = 16.87>
18	Turn the main frame power off.

Note: * The adjustment is not necessary for a long distance fiber.

4.8 LD Bias Current (OUTPUT POWER) Adjustment

Step	Procedure
1	Connect the plug-in unit to the main frame with the extender cord.
2	Turn the main frame power on.
3	Connect the fiber (2 km) to the plug-in unit.
4	Set the main frame as follows. DR=100 km PW=4 μs ATT=0 dB OUTPUT POWER=90
5	Turn the LD on.
6	Adjust the far end primary Fresner level to the first graduation from the top with R40 (A1 (I/O) PKG).

4.9 Overall Adjustment

4.9.1 Optical pulse width adjustment · A1 (I/O) PKG 2

Step	Procedure
1	Connect the plug-in unit to the main frame with the extender cord.
2	Connect the waveform monitor and the plug-in unit to the oscilloscope through the P-ATT.
3	Set the main frame as follows. DR=100 km PW=4 μs ATT=arbitrary
4	Turn the LD on and adjust the optical pulse width to 4 μs with R128.
5	Change the main frame setting as follows. DR=10 km PW=20 ns
6	Adjust the optical pulse width to 20ns with R134.
7	Turn the LD off.
8	Turn the main frame power off.

4.9.2 Verification of optical pulse waveform · A2 (AMP) PKG 3

Step	Procedure
1	Connect the plug-in unit to the main frame with the extender cord.
2	Connect the plug-in unit and the waveform monitor to the synchroscope through the P-ATT.
3	Turn the main frame power on.
4	Set the main frame as follows. DR = 10 km PW = 20 ns ATT = arbitrary
5	Turn the LD on.
6	If a ringing appears in the optical waveform, extinguish the ringing by turning R174.

4.9.3 CV adjustment

Step	Procedure
1	Connect the plug-in unit to the main frame with the extender cord.
2	Connect the fiber to the plug-in unit.
3	Turn the main frame power on.
4	Set the main frame as follows. DR = 10 km PW = 20 ns ATT = 7.5 dB HS = 5 m/div VS = 0.1 dB/div HS = 0 m
5	Turn the LD on.
6	Shorten the rise time and fall time with C16 as far as ringings do not occur in the pulse response.

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SECTION 5
REPLACEMENT PARTS

5.1 Introduction 5-3

5.2 Electrical Parts Ordering Procedure 5-4

5.3 Reading Capacitance and Resistance 5-5

5.4 Parts List 5-9

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5.1 Introduction

This section contains information for ordering replacement parts or components. The following is a list of abbreviations for circuit components (hereafter referred to by Ref No.) and abbreviations used for items in the Parts List.

(1) Abbreviations for circuit components

A	Assembly	J	Jack, plug, connector	P	Lamp	T	Trasnformer
AT	Attenuator	K	Relay	Q	Transistor, diode, IC, rectifier	V	Neon lamp, vacuum tube
C	Capacitor	L	Coil, microinductor	R	Resistor	X	Crystal OSC
F	Fuse	M	Meter, timer	S	Switch	Z	Unit

(2) Abbreviations

AC	alternating current	LCD	liquid crystal display
A/D	analog-to-digital	LED	light-emitting diode
ADJ	adjuster	LF	low frequency
AL	aluminum	LPF	low-pass filter
BEF	band-elimination filter	LSI	large scale integrated circuit
BIDIR	bidirectional	MDL	module
BPF	band-pass filter	NI-CD	Nickel Cadmium
CAP	capacitor	OPNL	operational
CER	ceramic	OSC	oscillator
CMOS	complementary metal oxide semiconductor	PDIO	photo diode
CONST	constant	PROM	programmable read only memory
D/A	digital-to-analog	PSU	power supply unit
DC	direct current	PUJT	programmable unijunction transistor
DIP	dual in-line package	RAM	random access memory
DIR	directional	REAC	reactance
DRAM	dynamic random access memory	RECT	rectangular
EEPROM	electrically erasable programmable read only memory	RES	resistor
ELECTLT	electrolytic	RF	radio frequency
EPROM	erasable programmable read only memory	SRAM	static random access memory
FET	field-effect transistor	TA	tantalum
F/V	frequency-to-voltage	VAR	variable
GEN	generator	VARICAP	variable capacitor
HPF	high-pass filter	VCO	voltage controlled oscillator
IC	integrated circuit	YIG	Yttrium Iron Garnet
IF	intermediate frequency		

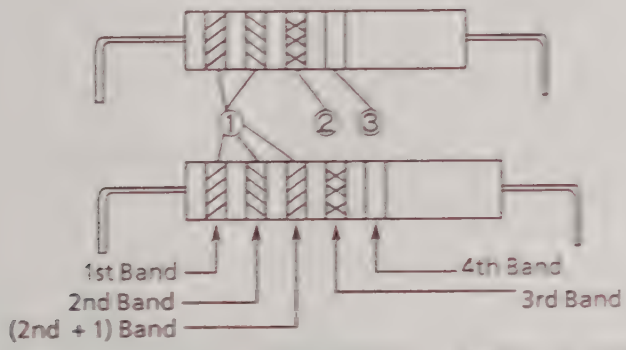
5.2 Electrical Parts Ordering Procedure

When ordering parts, please refer to the parts list and give the following description.

Item	Example
(1) Name of Instrument	MW0947B Plug-in Unit for MW9040B
(2) Name of Parts List	Parts List: A1 I/O BOARD
(3) Ref. No.	C1
(4) Parts Code (or part name)	AL ELECT CAP, CE04C1A101A *Note:* Part name is given in the Parts List Description column. When ordering apart or parts with an asterisk, the exact specifications are required.
(5) Quantity	1
(6) Serial No. of Instrument	M31257

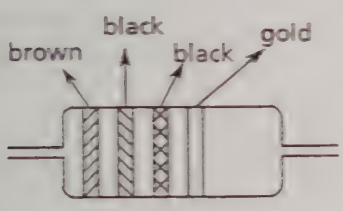
5.3 Reading Capacitance and Resistance

(1) Reading resistance

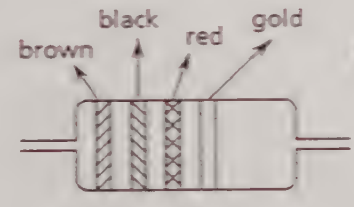


Color	① Figure		② Multiplier	③ Tolerance
	1st	2nd	3rd	4th
Black	0	0	$\times 10^0$	-
Brown	1	1	$\times 10^1$	-
Red	2	2	$\times 10^2$	-
Orange	3	3	$\times 10^3$	-
Yellow	4	4	$\times 10^4$	-
Green	5	5	$\times 10^5$	±0.5%
Blue	6	6	$\times 10^6$	-
Purple	7	7	$\times 10^7$	-
Gray	8	8	$\times 10^8$	-
White	9	9	$\times 10^9$	-
Gold	-	-	$\times 10^{-1}$	±5%
Silver	-	-	$\times 10^{-2}$	±10%
------	-	-		±20%

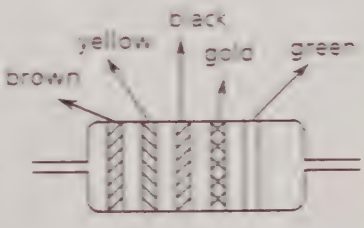
Examples:



$10 \times 10^0 \pm 5\%$
10 Ω, ±5%



$10 \times 10^2 \pm 5\%$
1 kΩ, ±5%



$140 \times 10^{-1} \pm 0.5\%$
14.0 kΩ, ±5%

(2) Reading chip ceramic capacitance

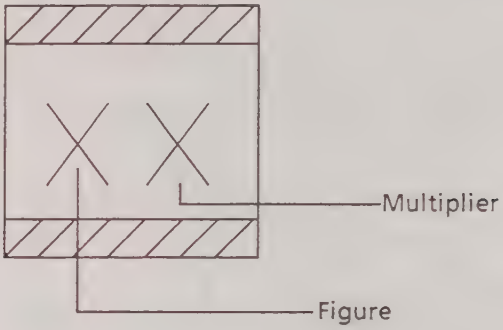
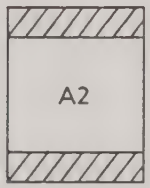


Figure					
Indicated alphabetic character	Corresponding value	Indicated alphabetic character	Corresponding value	Indicated alphabetic character	Corresponding value
A	1.0	M	3.0	Y	8.2
B	1.1	N	3.3	Z	9.1
C	1.2	P	3.6	a	2.5
D	1.3	Q	3.9	b	3.5
E	1.5	R	4.3	d	4.0
F	1.6	S	4.7	e	4.5
G	1.8	T	5.1	f	5.0
H	2.0	U	5.6	m	6.0
J	2.2	V	6.2	n	7.0
K	2.4	W	6.8	t	8.0
L	2.7	X	7.5	y	9.0

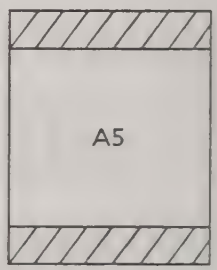
Multiplier	
Indicated value	Corresponding multiplier
0	10^0
1	10^1
2	10^2
3	10^3
4	10^4
5	10^5
6	10^7
7	10^7
8	10^8
9	10^{-1}

Examples:



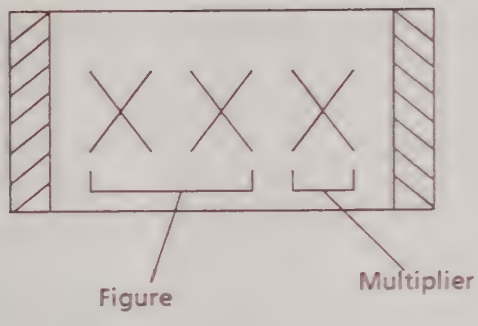
100 pF

8 pF



0.1 μF

(3) Reading chip resistance



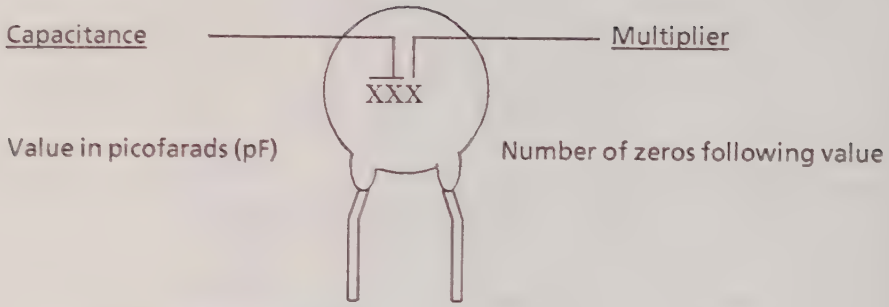
The first two characters are significant digits and the last numeric character indicates the number of zeros following these two characters.

A decimal point is represented by the character R. When the R representation is used, all numeric characters represent significant digits.

Examples:

100 Ω 10 kΩ 4.7 Ω

(4) Reading capacitance



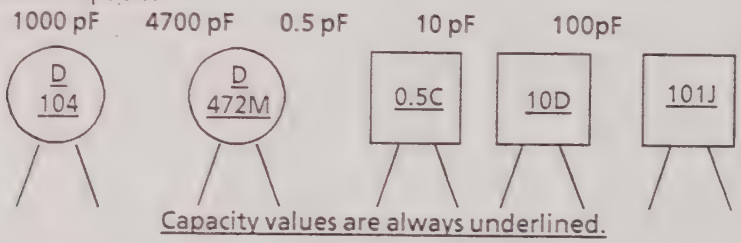
Examples: 103 = 10,000 pF = 10^{-8} F or 0.01 μF
302 = 3,000 pF = 3 x 10^{-9} F or 0.03 μF
676 = 67,000,000 pF = 67 x 10^{-6} F or 67 μF

(a) Ceramic and polyester capacitors

Indication	0.5	1	10	101	102	103	104
Capacitance	0.5 pF	1 pF	10 pF	100 pF	1000 pF	0.01 μF	0.1 μF

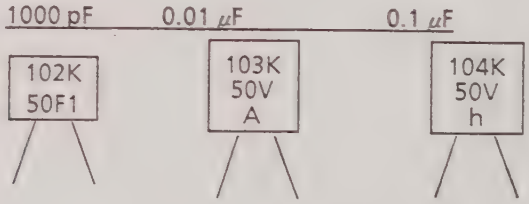
Examples:

Ceramic capacitor



Capacity values are always underlined.

Polyester capacitor

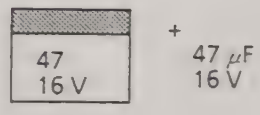


(b) Tantalum, metallized, and electrolytic capacitors

Indication	OR47	010	100	101
Capacitance	0.47 μF	1 μF	10 μF	100 μF

(c) Chip tantalum capacitance

Indication	0.47	4.7	47
Capacitance	0.47 μF	4.7 μF	47 μF



5.4 Parts List

No.	Name	Dwg. No.
1	Overall	W4W21913
2	A1 I/O	W4W21914
3	A2 AMP	W4W21915
4	A3 AO DRIVER (MW0945B)	W4W23030
4	A3 AO DRIVER (MW0946B)	W4W23033
4	A3 AO DRIVER (MW0947B)	W4W22252

1

Parts List of: MW0945B/09
46B/0947B SMF 1.31/1.55UM UNIT
PLUG-IN UNIT OVERALL

Ref. No.	Part Code	Description	Rating	Qty	Note
A 1		A1 I/O		1	W4W21914
A 2		A2 AMP		1	W4W21915
A 3		A3 A/O DRIVER		1	W4W22252 W4W23030 W4W23033
J 1		NOT ASSIGNED			
J 2		NOT ASSIGNED			
J 3		NOT ASSIGNED			
J 4		NOT ASSIGNED			
J 5		NOT ASSIGNED			
J 6		NOT ASSIGNED			
J 7		NOT ASSIGNED			
J 8		NOT ASSIGNED			
J 9		NOT ASSIGNED			
J 10		NOT ASSIGNED			
J 11		NOT ASSIGNED			
J 12		NOT ASSIGNED			
J 13		NOT ASSIGNED			
J 14		PC-FERRULE		1	
J 15		ADAPTOR		1	
J 16		PC-FERRULE		1	

Rev. No./Date

DESIGNED BY

CHECKED BY

APPROVED BY

Dep.

* : Selected at factory

Parts List of: MW0945B/09
46B/0947B SMF 1.31/1.55UM UNIT
PLUG-IN UNIT OVERALL

Ref. No.	Part Code	Description	Rating	Qty	Note
S 1		SWITCH UM10B10F01		1	
W 1		CABLE W42W20554 CABLE	60MM	1	
W 2		CABLE 27DP-LP-LP CABLE	150MM	1	
W 3		CABLE 27DP-P-LP CABLE	350MM	1	
W 4		CABLE DF1-2S2.5R24-32B-1	02P	1	
Z 1		OPTICAL MODULE		1	W39H6975

* : Selected at factory

Rev. No./Date

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Parts List of: MW0945B/09
46B/0947B SMF 1.31/1.55UM UNIT
A1 I/O

Ref. No.	Part Code	Description	Rating	Qty	Note
C 1		CER CAP	0.1μ F,50V		
		CK733F1H104Z	+80/-20%	1	
C 2		CER CAP	0.1μ F,50V		
		CK733F1H104Z	+80/-20%	1	
C 3		CER CAP	0.1μ F,50V		
		CK733F1H104Z	+80/-20%	1	
C 4		CER CAP	0.1μ F,50V		
		CK733F1H104Z	+80/-20%	1	
C 5		CER CAP	0.1μ F,50V		
		CK733F1H104Z	+80/-20%	1	
C 6		CER CAP	0.1μ F,50V		
		CK733F1H104Z	+80/-20%	1	
C 7		CER CAP	0.1μ F,50V		
		CK733F1H104Z	+80/-20%	1	
C 8		CER CAP	0.1μ F,50V		
		CK733F1H104Z	+80/-20%	1	
C 9		CER CAP	0.1μ F,50V		
		CK733F1H104Z	+80/-20%	1	
C 10		CER CAP	0.1μ F,50V		
		CK733F1H104Z	+80/-20%	1	
C 11		CER CAP	0.1μ F,50V		
		CK733F1H104Z	+80/-20%	1	
C 12		CER CAP	0.01μ F		
		CK732B1H103K	± 10%,50V	1	
C 13		CER CAP	0.01μ F		
		CK732B1H103K	± 10%,50V	1	
C 14		CER CAP	0.1μ F,50V		
		CK733F1H104Z	+80/-20%	1	
C 15		CER CAP	0.1μ F,50V		
		CK733F1H104Z	+80/-20%	1	
C 16		CER CAP	0.1μ F,50V		
		CK733F1H104Z	+80/-20%	1	
C 17		NOT ASSIGNED			
C 18		NOT ASSIGNED			
C 19		NOT ASSIGNED			
C 20		NOT ASSIGNED			
C 21		NOT ASSIGNED			
C 22		NOT ASSIGNED			
C 23		NOT ASSIGNED			

Rev. No./Date

DESIGNED BY

CHECKED BY

APPROVED BY

Dep.

* : Selected at factory

Parts List of: MW0945B/09
46B/0947B SMF 1.31/1.55UM UNIT
A1 I/O

Ref. No.	Part Code	Description	Rating	Qty	Note
C 24		NOT ASSIGNED			
C 25		NOT ASSIGNED			
C 26		NOT ASSIGNED			
C 27		NOT ASSIGNED			
C 28		NOT ASSIGNED			
C 29		NOT ASSIGNED			
C 30		NOT ASSIGNED			
C 31		NOT ASSIGNED			
C 32		NOT ASSIGNED			
C 33		CER CAP CK733F1H104Z	0.1μ F,50V +80/-20%	1	
C 34		CER CAP CK733F1H104Z	0.1μ F,50V +80/-20%	1	
C 35		CER CAP CK733F1H104Z	0.1μ F,50V +80/-20%	1	
C 36		CER CAP CK733F1H104Z	0.1μ F,50V +80/-20%	1	
C 37		CER CAP CK733F1H104Z	0.1μ F,50V +80/-20%	1	
C 38		CER CAP CK733F1H104Z	0.1μ F,50V +80/-20%	1	
C 39		NOT ASSIGNED			
C 40		NOT ASSIGNED			
C 41		NOT ASSIGNED			
C 42		CER CAP CK924C1H472M	4700p F ± 20%,50V	1	
C 43		CER CAP CK733F1H104Z	0.1μ F,50V +80/-20%	1	
C 44		CER CAP CK733F1H104Z	0.1μ F,50V +80/-20%	1	
C 45		CER CAP CK733F1H104Z	0.1μ F,50V +80/-20%	1	
C 46		CER CAP CK733F1H104Z	0.1μ F,50V +80/-20%	1	

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Parts List of: MW0945B/09
46B/0947B SMF 1.31/1.55UM UNIT
A1 I/O

Ref. No.	Part Code	Description	Rating	Qty	Note
C 47		CER CAP	0.1μ F,50V		
		CK733F1H104Z	+80/-20%	1	
C 48		CER CAP	470p F		
		CC924CH1H471J	± 5%,50V	1	
C 49		CER CAP	0.1μ F,50V		
		CK733F1H104Z	+80/-20%	1	
C 50		CER CAP	0.1μ F,50V		
		CK733F1H104Z	+80/-20%	1	
C 51		AL ELECTLT CAP	330μ F		
		KMG25VB330(M)	± 20%,25V	1	
C 52		AL ELECTLT CAP	330μ F		
		KMG25VB330(M)	± 20%,25V	1	
C 53		AL ELECTLT CAP	330μ F		
		KMG25VB330(M)	± 20%,25V	1	
C 54		AL ELECTLT CAP	330μ F		
		CE04C1E331A	± 20%,25V	1	
C 55		CER CAP	1μ F,50V		
		CK737F1H105Z	+80/-20%	1	
C 56		CER CAP	0.01μ F		
		CK732B1H103K	± 10%,50V	1	
C 57		CER CAP	0.01μ F		
		CK732B1H103K	± 10%,50V	1	
C 58		CER CAP	1μ F,50V		
		CK737F1H105Z	+80/-20%	1	
C 59		AL ELECTLT CAP	100μ F		
		CE04C1E101A	± 20%,25V	1	
C 60		AL ELECTLT CAP	100μ F		
		CE04C1A101A	± 20%,10V	1	
C 61		CER CAP	1μ F,50V		
		CK737F1H105Z	+80/-20%	1	
C 62		CER CAP	0.01μ F		
		CK732B1H103K	± 10%,50V	1	
C 63		CER CAP	0.01μ F		
		CK732B1H103K	± 10%,50V	1	
C 64		CER CAP	1μ F,50V		
		CK737F1H105Z	+80/-20%	1	
C 65		AL ELECTLT CAP	100μ F		
		CE04C1A101A	± 20%,10V	1	
C 66		AL ELECTLT CAP	100μ F		
		CE04C1E101A	± 20%,25V	1	
C 67		CER CAP	1μ F,50V		
		CK737F1H105Z	+80/-20%	1	
C 68		AL ELECTLT CAP	100μ F		
		CE04C1A101A	± 20%,10V	1	
C 69		AL ELECTLT CAP	100μ F		
		CE04C1A101A	± 20%,10V	1	

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46B/0947B SMF 1.31/1.55UM UNIT
A1 I/O

Ref. No.	Part Code	Description	Rating	Qty	Note
C 70		CER CAP	0.01μ F		
		CK732B1H103K	± 10%,50V	1	
C 71		CER CAP	1μ F,50V		
		CK737F1H105Z	+80/-20%	1	
C 72		AL ELECTLT CAP	100μ F		
		CE04C1E101A	± 20%,25V	1	
C 73		CER CAP	1μ F,50V		
		CK737F1H105Z	+80/-20%	1	
C 74		CER CAP	0.01μ F		
		CK732B1H103K	± 10%,50V	1	
C 75		AL ELECTLT CAP	100μ F		
		CE04C1A101A	± 20%,10V	1	
C 76		CER CAP	1μ F,50V		
		CK737F1H105Z	+80/-20%	1	
C 77		NOT ASSIGNED			
C 78		CER CAP	0.01μ F		
		CK732B1H103K	± 10%,50V	1	
C 79		CER CAP	0.01μ F		
		CK732B1H103K	± 10%,50V	1	
C 80		CER CAP	1μ F,50V		
		CK737F1H105Z	+80/-20%	1	
C 81		AL ELECTLT CAP	100μ F		
		CE04C1E101A	± 20%,25V	1	
C 82		CER CAP	0.01μ F		
		CK732B1H103K	± 10%,50V	1	
C 83		CER CAP	1μ F,50V		
		CK737F1H105Z	+80/-20%	1	
C 84		AL ELECTLT CAP	100μ F		
		CE04C1A101A	± 20%,10V	1	
C 85		CER CAP	0.01μ F		
		CK732B1H103K	± 10%,50V	1	
C 86		CER CAP	1μ F,50V		
		CK737F1H105Z	+80/-20%	1	
C 87		AL ELECTLT CAP	100μ F		
		CE04C1E101A	± 20%,25V	1	
C 88		CER CAP	0.01μ F		
		CK732B1H103K	± 10%,50V	1	
C 89		CER CAP	1μ F,50V		
		CK737F1H105Z	+80/-20%	1	
C 90		AL ELECTLT CAP	100μ F		
		CE04C1E101A	± 20%,25V	1	
C 91		NOT ASSIGNED			
C 92		NOT ASSIGNED			

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46B/0947B SMF 1.31/1.55UM UNIT
A1 I/O

Ref. No.	Part Code	Description	Rating	Qty	Note
C 93		CER CAP	1000p F		
		CC732CH1H102J	± 5%,50V	1	
C 94		CER CAP	4700p F		
		CK732B1H472K	± 10%,50V	1	
C 95		CER CAP	1000p F		
		CK732B1H102K	± 10%,50V	1	
C 96		CER CAP	1000p F		
		CK732B1H102K	± 10%,50V	1	
C 97		CER CAP	0.1μ F,50V		
		CK733F1H104Z	+80/-20%	1	
C 98		CER CAP	0.1μ F,50V		
		CK733F1H104Z	+80/-20%	1	
C 99		CER CAP	0.1μ F,50V		
		CK733F1H104Z	+80/-20%	1	
C 100		CER CAP	0.1μ F,50V		
		CK733F1H104Z	+80/-20%	1	
C 101		CER CAP	0.1μ F,50V		
		CK733F1H104Z	+80/-20%	1	
C 102		AL ELECTLT CAP	2200μ F		
		KME10T2200	± 20%,10V	1	
C 103		AL ELECTLT CAP	2200μ F		
		KME10T2200	± 20%,10V	1	
C 104		AL ELECTLT CAP	2200μ F		
		KME10T2200	± 20%,10V	1	
C 105		NOT ASSIGNED			
C 106		CER CAP	1000p F		
		CK732B1H102K	± 10%,50V	1	
C 107		NOT ASSIGNED			
C 108		AL ELECTLT CAP	100μ F		
		CE04C1A101A	± 20%,10V	1	
C 109		CER CAP	1μ F,50V		
		CK737F1H105Z	+80/-20%	1	
C 110		CER CAP	0.01μ F		
		CK732B1H103K	± 10%,50V	1	
C 111		CER CAP	0.01μ F		
		CK732B1H103K	± 10%,50V	1	
C 112		CER CAP	1μ F,50V		
		CK737F1H105Z	+80/-20%	1	
C 113		AL ELECTLT CAP	100μ F		
		CE04C1A101A	± 20%,10V	1	
C 114		AL ELECTLT CAP	100μ F		
		CE04C1E101A	± 20%,25V	1	
C 115		CER CAP	0.1μ F,50V		
		CK733F1H104Z	+80/-20%	1	

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A1 I/O

Ref. No.	Part Code	Description	Rating	Qty	Note
C 116		CER CAP	0.1μ F,50V		
		CK733F1H104Z	+80/-20%	1	
C 117		AL ELECTLT CAP	100μ F		
		CE04C1E101A	± 20%,25V	1	
C 118		CER CAP	0.1μ F,50V		
		CK733F1H104Z	+80/-20%	1	
C 119		CER CAP	0.1μ F,50V		
		CK733F1H104Z	+80/-20%	1	
C 120		CER CAP	0.01μ F		
		CK732B1H103K	± 10%,50V	1	
C 121		CER CAP	0.01μ F		
		CK732B1H103K	± 10%,50V	1	
C 122		CER CAP	0.1μ F,50V		
		CK733F1H104Z	+80/-20%	1	
C 123		CER CAP	0.01μ F		
		CK732B1H103K	± 10%,50V	1	
C 124		AL ELECTLT CAP	100μ F		
		CE04C1A101A	± 20%,10V	1	
C 125		CER CAP	0.01μ F		
		CK732B1H103K	± 10%,50V	1	
C 126		CER CAP	47p F		
		CC732CH1H470J	± 5%,50V	1	
C 127		CER CAP	0.01μ F		
		CK732B1H103K	± 10%,50V	1	
C 128		CER CAP	0.1μ F,50V		
		CK733F1H104Z	+80/-20%	1	
C 129		AL ELECTLT CAP	100μ F		
		CE04C1A101A	± 20%,10V	1	
C 130		CER CAP	0.01μ F		
		CK732B1H103K	± 10%,50V	1	
C 131		NOT ASSIGNED			
C 132		NOT ASSIGNED			
C 133		CER CAP	1000p F		
		CK732B1H102K	± 10%,50V	1	
C 134		CER CAP	1000p F		
		CK732B1H102K	± 10%,50V	1	
C 135		CER CAP	0.1μ F,50V		
		CK733F1H104Z	+80/-20%	1	
C 136		NOT ASSIGNED			
C 137		CER CAP	0.1μ F,50V		
		CK733F1H104Z	+80/-20%	1	
C 138		NOT ASSIGNED			

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A1 I/O

Ref. No.	Part Code	Description	Rating	Qty	Note
C 139		CER CAP CK733F1H104Z	0.1μ F,50V +80/-20%	1	
C 140		CER CAP CK732B1H103K	0.01μ F ± 10%,50V	1	
C 141		NOT ASSIGNED			
C 142		CER CAP CK732B1H102K	1000p F ± 10%,50V	1	
C 143		CER CAP CK732B1H103K	0.01μ F ± 10%,50V	1	
C 144		CER CAP CK732B1H103K	0.01μ F ± 10%,50V	1	
J 1		JACK HIF3FB-40DA-2.54DSA	40P	1	
J 2		JACK HIF3FB-26DA-2.54DSA	26P	1	
J 3		PLUG DF1-8P2.5DSA	8P	1	
J 4		PLUG PCN10F-60P-2.54DS	60P	1	
J 5		JACK 27DP-LR-PC		1	
J 6		NOT ASSIGNED			
J 7		PLUG DF1-2P2.5DSA	2P	1	
J 8		NOT ASSIGNED			
J 9		NOT ASSIGNED			
J 10		FFC-3AMEP		1	
J 11		DIC252		1	
J 12		PLUG DF1-5P2.5DSA	5P	1	
J 13		DIC252		1	
J 14		FFC-3AMEP		1	
J 15		DIC252		1	

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A1 I/O

Ref. No.	Part Code	Description	Rating	Qty	Note
J 16		FFC-3AMEP		1	
K 1		NOT ASSIGNED			
K 2		PHOTO MOS RELAY AQV214		1	
K 3		PHOTO MOS RELAY AQV214		1	
K 4		NOT ASSIGNED			
K 5		PHOTO MOS RELAY AQV214		1	
L 1		INDUCTOR TSL1110-471K	470μ H	1	
L 2		INDUCTOR TSL1110-471K	470μ H	1	
L 3		INDUCTOR TSL1110-471K	470μ H	1	
L 4		INDUCTOR SP0408-2R2K	2.2μ H, ± 10%	1	
L 5		INDUCTOR TSL1110-471K	470μ H	1	
L 6		INDUCTOR SDP-063C		1	
L 7		INDUCTOR SH-302		1	
L 8		INDUCTOR TSL1110-471K	470μ H	1	
L 9		INDUCTOR TSL1110-471K	470μ H	1	
Q 1		IC 74HC245F		1	
Q 2		IC 74HC541F		1	
Q 3		IC 74HC14F		1	
Q 4		IC 74HC138F		1	
Q 5		IC 74HC32F		1	

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A1 I/O

Ref. No.	Part Code	Description	Rating	Qty	Note
Q 6		IC 74HC273F		1	
Q 7		IC 74HC273F		1	
Q 8		IC EEPROM28C256-P		1	
Q 9		IC 74HC273F		1	
Q 10		IC 74HC32F		1	
Q 11		IC 74HC273F		1	
Q 12		IC 74HC541F		1	
Q 13		IC 74HC273F		1	
Q 14		PHOTO COUPLER PS2503-4		1	
Q 15		PHOTO COUPLER PS2503-4		1	
Q 16		PHOTO COUPLER PS2503-4		1	
Q 17		PHOTO COUPLER PS2503-4		1	
Q 18		PHOTO COUPLER PS2503-4		1	
Q 19		PHOTO COUPLER PS2503-4		1	
Q 20		IC TC74HC123AF		1	
Q 21		IC 74HC541F		1	
Q 22		IC 74HC541F		1	
Q 23		IC 74HC541F		1	
Q 24		NOT ASSIGNED			
Q 25		NOT ASSIGNED			
Q 26		NOT ASSIGNED			
Q 27		NOT ASSIGNED			
Q 28		NOT ASSIGNED			

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A1 I/O

Ref. No.	Part Code	Description	Rating	Qty	Note
Q 29		NOT ASSIGNED			
Q 30		TRANSISTOR FT6022		1	
Q 31		TRANSISTOR FT6022		1	
Q 32		NOT ASSIGNED			
Q 33		NOT ASSIGNED			
Q 34		NOT ASSIGNED			
Q 35		NOT ASSIGNED			
Q 36		IC μPC14305HF		1	
Q 37		IC 74HC00F		1	
Q 38		IC 74HC138F		1	
Q 39		IC 74HC541F		1	
Q 40		IC 74HC273F		1	
Q 41		IC NJU8001M		1	
Q 42		IC 74HC14F		1	
Q 43		IC 74HC86F		1	
Q 44		IC 74HC74F		1	
Q 45		IC μPC1251G2		1	
Q 46		IC 74HC541F		1	
Q 47		PHOTO COUPLER PS2503-2		1	
Q 48		DIODE A1SS123		1	
Q 49		IC μPC337H		1	
Q 50		TRANSISTOR 2SA812		1	
Q 51		TRANSISTOR 2SC1623		1	

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A1 I/O

Ref. No.	Part Code	Description	Rating	Qty	Note
Q 52		NOT ASSIGNED			
Q 53		NOT ASSIGNED			
Q 54		NOT ASSIGNED			
Q 55		NOT ASSIGNED			
Q 56		NOT ASSIGNED			
Q 57		NOT ASSIGNED			
Q 58		NOT ASSIGNED			
Q 59		NOT ASSIGNED			
Q 60		NOT ASSIGNED			
Q 61		NOT ASSIGNED			
Q 62		NOT ASSIGNED			
Q 63		IC MC10H102M		1	
Q 64		NOT ASSIGNED			
Q 65		IC MC10198P		1	
Q 66		IC MC10198P		1	
Q 67		NOT ASSIGNED			
Q 68		NOT ASSIGNED			
Q 70		IC 10E101		1	
Q 71		IC MC10H102M		1	
Q 72		IC 74HC138F		1	
Q 73		IC MC10H124M		1	
Q 74		NOT ASSIGNED			
Q 75		IC MC10H105M		1	

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A1 I/O

Ref. No.	Part Code	Description	Rating	Qty	Note
Q 76		NOT ASSIGNED			
Q 77		NOT ASSIGNED			
Q 78		NOT ASSIGNED			
Q 79		IC 74HC541F		1	
Q 80		IC μ PC458G2		1	
Q 81		IC μ PC177G2		1	
Q 82		DIODE A1SS123		1	
Q 83		DIODE A1SS123		1	
Q 84		IC MC10H102M		1	
Q 85		DIODE A1SS123		1	
Q 86		IC MAX690EPA		1	
R 1		RES ARRAY RRS-8-473JA	47KΩ ± 5%	1	
R 2		RES ARRAY RRS-8-473JA	47KΩ ± 5%	1	
R 3		CERMET RESISTOR RK73M2A472J	4.7KΩ ± 5%,1/10W	1	
R 4		CERMET RESISTOR RK73M2A223J	22KΩ ± 5%,1/10W	1	
R 5		CERMET RESISTOR RK73M2A333J	33KΩ ± 5%,1/10W	1	
R 6		RES ARRAY RRS-8-332JA	3.3KΩ ± 5%	1	
R 7		RES ARRAY RRS-8-472JA	4.7KΩ ± 5%	1	
R 8		RES ARRAY RRS-8-222JA	2.2KΩ ± 5%	1	
R 9		RES ARRAY RRS-8-332JA	3.3KΩ ± 5%	1	
R 10		RES ARRAY RRS-8-332JA	3.3KΩ ± 5%	1	

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46B/0947B SMF 1.31/1.55UM UNIT
A1 I/O

Ref. No.	Part Code	Description	Rating	Qty	Note
R 11		RES ARRAY RRS-8-332JA	3.3KΩ ± 5%	1	
R 12		CERMET RESISTOR RK73M2A103J	10KΩ ± 5%,1/10W	1	
R 13		RES ARRAY RRS-8-472JA	4.7KΩ ± 5%	1	
R 14		NOT ASSIGNED			
R 15		NOT ASSIGNED			
R 16		NOT ASSIGNED			
R 17		NOT ASSIGNED			
R 18		NOT ASSIGNED			
R 19		NOT ASSIGNED			
R 20		NOT ASSIGNED			
R 21		NOT ASSIGNED			
R 22		NOT ASSIGNED			
R 23		NOT ASSIGNED			
R 24		NOT ASSIGNED			
R 25		NOT ASSIGNED			
R 26		NOT ASSIGNED			
R 27		NOT ASSIGNED			
R 28		NOT ASSIGNED			
R 29		NOT ASSIGNED			
R 30		NOT ASSIGNED			
R 31		NOT ASSIGNED			
R 32		NOT ASSIGNED			
R 33		NOT ASSIGNED			

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46B/0947B SMF 1.31/1.55UM UNIT
A1 I/O

Ref. No.	Part Code	Description	Rating	Qty	Note
R 34		NOT ASSIGNED			
R 35		NOT ASSIGNED			
R 36		NOT ASSIGNED			
R 37		NOT ASSIGNED			
R 38		NOT ASSIGNED			
R 39		NOT ASSIGNED			
R 40		VARIABLE RESISTOR RG04B204H	200KΩ 1/4W	1	
R 41		CERMET RESISTOR RK73M2A154J	150KΩ ± 5%,1/10W	1	
R 42		CERMET RESISTOR RK73M2A104J	100KΩ ± 5%,1/10W	1	
R 43		CERMET RESISTOR RK73M2A104J	100KΩ ± 5%,1/10W	1	
R 44		NOT ASSIGNED			
R 45		VARIABLE RESISTOR RG04B502H	5KΩ 1/4W	1	
R 46		NOT ASSIGNED			
R 47		NOT ASSIGNED			
R 48		NOT ASSIGNED			
R 49		NOT ASSIGNED			
R 50		NOT ASSIGNED			
R 51		NOT ASSIGNED			
R 52		NOT ASSIGNED			
R 53		NOT ASSIGNED			
R 54		RES ARRAY RRS-8-104JA	100KΩ ± 5%	1	
R 55		CARBON FILM RES ARD25T103J	10KΩ ± 5%,1/4W	1	
R 56		CERMET RESISTOR RK73M2A473J	47KΩ ± 5%,1/10W	1	

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A1 I/O

Ref. No.	Part Code	Description	Rating	Qty	Note
R 57		CERMET RESISTOR RK73M2A154J	150KΩ ± 5%,1/10W	1	
R 58		NOT ASSIGNED			
R 59		NOT ASSIGNED			
R 60		RES ARRAY RRS-4-104JA	100KΩ ± 5%	1	
R 61		CERMET RESISTOR RK73M2A472J	4.7KΩ ± 5%,1/10W	1	
R 62		CERMET RESISTOR RK73M2A472J	4.7KΩ ± 5%,1/10W	1	
R 63		CERMET RESISTOR RK73M2A472J	4.7KΩ ± 5%,1/10W	1	
R 64		CERMET RESISTOR RK73M2A472J	4.7KΩ ± 5%,1/10W	1	
R 65		NOT ASSIGNED			
R 66		METAL FILM RESISTOR RN73G2A121D	120Ω ± 0.5%,1/10W	1	
R 67		METAL FILM RESISTOR RN~3G2A201D	200Ω ± 0.5%,1/10W	1	
R 68		NOT ASSIGNED			
R 69		NOT ASSIGNED			
R 70		NOT ASSIGNED			
R 71		NOT ASSIGNED			
R 72		CERMET RESISTOR RK73M2A472J	4.7KΩ ± 5%,1/10W	1	
R 73		CERMET RESISTOR RK73M2A822J	8.2KΩ ± 5%,1/10W	1	
R 74		CERMET RESISTOR RK73M2A472J	4.7KΩ ± 5%,1/10W	1	
R 75		CERMET RESISTOR RK73M2A151J	150Ω ± 5%,1/10W	1	
R 76		NOT ASSIGNED			
R 77		NOT ASSIGNED			
R 78		NOT ASSIGNED			
R 79		NOT ASSIGNED			

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* : Selected at factory

Parts List of: MW0945B/09
46B/0947B SMF 1.31/1.55UM UNIT
A1 I/O

Ref. No.	Part Code	Description	Rating	Qty	Note
R 80		NOT ASSIGNED			
R 81		NOT ASSIGNED			
R 82		NOT ASSIGNED			
R 83		NOT ASSIGNED			
R 84		NOT ASSIGNED			
R 85		NOT ASSIGNED			
R 86		CERMET RESISTOR RK73M2A681J	680Ω ± 5%,1/10W	1	
R 87		CERMET RESISTOR RK73M2A103J	10KΩ ± 5%,1/10W	1	
R 88		CERMET RESISTOR RK73M2A103J	10KΩ ± 5%,1/10W	1	
R 89		CERMET RESISTOR RK73M2A681J	680Ω ± 5%,1/10W	1	
R 90		NOT ASSIGNED			
R 91		CERMET RESISTOR RK73M2A681J	680Ω ± 5%,1/10W	1	
R 92		NOT ASSIGNED			
R 93		NOT ASSIGNED			
R 94		CERMET RESISTOR RK73M2A103J	10KΩ ± 5%,1/10W	1	
R 95		CERMET RESISTOR RK73M2A103J	10KΩ ± 5%,1/10W	1	
R 96		CERMET RESISTOR RK73M2A681J	680Ω ± 5%,1/10W	1	
R 97		NOT ASSIGNED			
R 98		CERMET RESISTOR RK73M2A681J	680Ω ± 5%,1/10W	1	
R 99		NOT ASSIGNED			
R 100		NOT ASSIGNED			
R 101		NOT ASSIGNED			
R 102		NOT ASSIGNED			

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* : Selected at factory

Parts List of: MW0945B/09
46B/0947B SMF 1.31/1.55UM UNIT
A1 I/O

Ref. No.	Part Code	Descript on	Rating	Qty	Note
R 103		NOT ASSIGNED			
R 104		NOT ASSIGNED			
R 105		NOT ASSIGNED			
R 106		NOT ASSIGNED			
R 107		NOT ASSIGNED			
R 108		NOT ASSIGNED			
R 109		NOT ASSIGNED			
R 110		CERMET RESISTOR RK73M2A681J	680Ω ± 5%,1/10W	1	
R 111		CERMET RESISTOR RK73M2A820J	82Ω ± 5%,1/10W	1	
R 112		CARBON FILM RES ARD25T151J	150Ω ± 5%,1/4W	1	
R 113		CERMET RESISTOR RK73M2A820J	82Ω ± 5%,1/10W	1	
R 114		CARBON FILM RES ARD25T151J	150Ω ± 5%,1/4W	1	
R 120		NOT ASSIGNED			
R 121		CERMET RESISTOR RK73M2A182J	1.8KΩ ± 5%,1/10W	1	
R 122		CERMET RESISTOR RK73M2A182J	1.8KΩ ± 5%,1/10W	1	
R 123		NOT ASSIGNED			
R 124		VARIABLE RESISTOR RG04B501H	500Ω 1/4W	1	
R 125		NOT ASSIGNED			
R 126		NOT ASSIGNED			
R 127		CERMET RESISTOR RK73M2A182J	1.8KΩ ± 5%,1/10W	1	
R 128		VARIABLE RESISTOR RG04B102H	1KΩ 1/4W	1	
R 129		CERMET RESISTOR RK73M2A510J	51Ω ± 5%,1/10W	1	
R 130		CERMET RESISTOR RK73M2A510J	51Ω ± 5%,1/10W	1	

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Parts List of: MW0945B/09
46B/0947B SMF 1.31/1.55UM UNIT
A1 I/O

Ref. No.	Part Code	Description	Rating	Qty	Note
R 131		CERMET RESISTOR RK73M2A510J	51Ω ± 5%,1/10W	1	
R 132		CERMET RESISTOR RK73M2A331J	330Ω ± 5%,1/10W	1	
R 133		CERMET RESISTOR RK73M2A101J	100Ω ± 5%,1/10W	1	
R 134		VARIABLE RESISTOR RG04B202H	2KΩ 1/4W	1	
R 135		CERMET RESISTOR RK73M2A510J	51Ω ± 5%,1/10W	1	
R 136		CERMET RESISTOR RK73M2A101J	100Ω ± 5%,1/10W	1	
R 137		CERMET RESISTOR RK73M2A510J	51Ω ± 5%,1/10W	1	
R 138		CERMET RESISTOR RK73M2A472J	4.7KΩ ± 5%,1/10W	1	
R 139		CERMET RESISTOR RK73M2A472J	4.7KΩ ± 5%,1/10W	1	
R 140		CERMET RESISTOR RK73M2A681J	680Ω ± 5%,1/10W	1	
R 141		CERMET RESISTOR RK73M2A681J	680Ω ± 5%,1/10W	1	
R 142		CERMET RESISTOR RK73M2A681J	680Ω ± 5%,1/10W	1	
R 143		CERMET RESISTOR RK73M2A681J	680Ω ± 5%,1/10W	1	
R 144		CERMET RESISTOR RK73M2A681J	680Ω ± 5%,1/10W	1	
R 145		NOT ASSIGNED			
R 146		NOT ASSIGNED			
R 147		NOT ASSIGNED			
R 148		NOT ASSIGNED			
R 149		CERMET RESISTOR RK73M2A681J	680Ω ± 5%,1/10W	1	
R 150		VARIABLE RESISTOR RG04B502H	5KΩ 1/4W	1	
R 151		CERMET RESISTOR RK73M2A153J	15KΩ ± 5%,1/10W	1	
R 152		CERMET RESISTOR RK73M2A153J	15KΩ ± 5%,1/10W	1	
R 153		CERMET RESISTOR RK73M2A154J	150KΩ ± 5%,1/10W	1	

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Parts List of: MW0945B/09
46B/0947B SMF 1.31/1.55UM UNIT
A1 I/O

Ref. No.	Part Code	Description	Rating	Qty	Note
R 154		CERMET RESISTOR RK73M2A103J	10KΩ ± 5%,1/10W	1	
R 155		CERMET RESISTOR RK73M2A153J	15KΩ ± 5%,1/10W	1	
R 156		CERMET RESISTOR RK73M2A153J	15KΩ ± 5%,1/10W	1	
R 157		CERMET RESISTOR RK73M2A103J	10KΩ ± 5%,1/10W	1	
R 158		CERMET RESISTOR RK73M2A103J	10KΩ ± 5%,1/10W	1	
R 159		CERMET RESISTOR RK73M2A473J	47KΩ ± 5%,1/10W	1	
R 160		CERMET RESISTOR RK73M2A103J	10KΩ ± 5%,1/10W	1	
R 161		CERMET RESISTOR RK73M2A473J	47KΩ ± 5%,1/10W	1	
R 162		CERMET RESISTOR RK73M2A473J	47KΩ ± 5%,1/10W	1	
R 163		CERMET RESISTOR RK73M2A183J	18KΩ ± 5%,1/10W	1	
R 164		CERMET RESISTOR RK73M2A153J	15KΩ ± 5%,1/10W	1	
R 165		CERMET RESISTOR RK73M2A153J	15KΩ ± 5%,1/10W	1	
R 166		CERMET RESISTOR RK73M2A154J	150KΩ ± 5%,1/10W	1	
R 167		CERMET RESISTOR RK73M2A103J	10KΩ ± 5%,1/10W	1	
R 168		CERMET RESISTOR RK73M2A153J	15KΩ ± 5%,1/10W	1	
R 169		CERMET RESISTOR RK73M2A153J	15KΩ ± 5%,1/10W	1	
R 170		CERMET RESISTOR RK73M2A154J	150KΩ ± 5%,1/10W	1	
R 171		CERMET RESISTOR RK73M2A154J	150KΩ ± 5%,1/10W	1	
R 172		CERMET RESISTOR RK73M2A103J	10KΩ ± 5%,1/10W	1	
R 173		CERMET RESISTOR RK73M2A103J	10KΩ ± 5%,1/10W	1	
R 174		CERMET RESISTOR RK73M2A473J	47KΩ ± 5%,1/10W	1	
R 175		CERMET RESISTOR RK73M2A473J	47KΩ ± 5%,1/10W	1	
R 176		CERMET RESISTOR RK73M2A473J	47KΩ ± 5%,1/10W	1	

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Parts List of: MW0945B/09
46B/0947B SMF 1.31/1.55UM UNIT
A1 I/O

Ref. No.	Part Code	Description	Rating	Qty	Note
R 177		CERMET RESISTOR RK73M2A183J	18KΩ ± 5%,1/10W	1	
R 178		CERMET RESISTOR RK73M2A473J	47KΩ ± 5%,1/10W	1	
R 179		CERMET RESISTOR RK73M2A183J	18KΩ ± 5%,1/10W	1	
R 180		CERMET RESISTOR RK73M2A272J	2.7KΩ ± 5%,1/10W	1	
R 181		NOT ASSIGNED			
R 182		NOT ASSIGNED			
R 183		CERMET RESISTOR RK73M2A820J	82Ω ± 5%,1/10W	1	
R 184		CARBON FILM RES ARD25T151J	150Ω ± 5%,1/4W	1	
R 185		CERMET RESISTOR RK73M2A103J	10KΩ ± 5%,1/10W	1	
R 186		CERMET RESISTOR RK73M2A223J	22KΩ ± 5%,1/10W	1	
R 187		CERMET RESISTOR RK73M2A103J	10KΩ ± 5%,1/10W	1	
W 1		CABLE 27DP-P CABLE	60MM	1	
Z 1		DC/DC CONVERTER IKS-1212		1	
Z 2		NOT ASSIGNED			
Z 3		NOT ASSIGNED			
Z 4		NOT ASSIGNED			
Z 5		FILTER ZJK5103-05		1	
Z 6		FILTER ZJK5103-05		1	
Z 7		FILTER ZJK5103-05		1	

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Parts List of: MW0945B/09
46B/0947B SMF 1.31/1.55UM UNIT
A1 I/O

Ref. No.	Part Code	Description	Rating	Qty	Note
E 1		NOT ASSIGNED			
E 2		NOT ASSIGNED			
E 3		NOT ASSIGNED			
E 4		NOT ASSIGNED			
E 5		LC-2-S ORANGE		1	
E 6		LC-2-S ORANGE		1	
E 7		NOT ASSIGNED			
E 8		NOT ASSIGNED			
E 9		NOT ASSIGNED			
E 10		LC-2-S YELLOW		1	
E 11		NOT ASSIGNED			
E 12		NOT ASSIGNED			
E 13		NOT ASSIGNED			
E 14		LC-2-S ORANGE		1	
E 15		LC-2-S YELLOW		1	
E 16		LC-2-S ORANGE		1	
E 17		LC-2-S ORANGE		1	
E 18		LC-2-S ORANGE		1	
E 19		LC-2-S ORANGE		1	
E 20		NOT ASSIGNED			
E 21		NOT ASSIGNED			
E 22		NOT ASSIGNED			
E 23		NOT ASSIGNED			

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Parts List of: MW0945B/09
46B/0947B SMF 1.31/1.55UM UNIT
A1 I/O

Ref. No.	Part Code	Description	Rating	Qty	Note
E 24		LC-2-S YELLOW		1	
E 25		NOT ASSIGNED			
E 26		LC-2-S ORANGE		1	
E 27		LC-2-S BLACK		1	
E 28		LC-2-S BLACK		1	

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Dep.

* : Selected at factory

DRAWING No. W4W21914 22/22

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Parts List of :

MW0945B/0946B/0947B WD SMF UNIT
A2 AMP

Ref. No.	Part Code	Description	Rating	Qty	Note
C 1	1-300394	AL ELECTLT CAP CE04C1E221A	220μF ±20%, 25V	1	
C 2	1-300394	AL ELECTLT CAP CE04C1E221A	220μF ±20%, 25V	1	
C 3		TA ELECTLT CAP SVFC1D475M	4.7μF ±20%, 20V	1	
C 4		CER CAP CK737F1H105Z	1μF +80/-20%	1	
C 5		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 6		CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 7	1-300394	AL ELECTLT CAP CE04C1E221A	220μF ±20%, 25V	1	
C 8	1-300394	AL ELECTLT CAP CE04C1E221A	220μF ±20%, 25V	1	
C 9		TA ELECTLT CAP SVFC1D475M	4.7μF ±20%, 20V	1	
C 10		CER CAP CK737F1H105Z	1μF +80/-20%	1	
C 11		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 12		CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 13		CER CAP CC45CK1H020CY	2pF ±0.25pF	1	
C 14		CER CAP CC45CH1H200JY	20pF ±5%, 50V	1	
C 15		NOT ASSIGN			
C 16	1-418468	VAR CER CAP TZ03Z2R3A	2.3pF 100V ±0.05pF	1	
C 17		CER CAP CC45CK1H010CY	1pF ±0.25pF	1	
C 18	1-300394	AL ELECTLT CAP CE04C1E221A	220μF ±20%, 25V	1	
C 19	1-300394	AL ELECTLT CAP CE04C1E221A	220μF ±20%, 25V	1	
C 20		CER CAP CK737F1H105Z	1μF +80/-20%	1	
C 21		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 22		CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 23		NOT ASSIGN			

Rev. No./Date

DESIGNED BY 920513

CHECKED BY 920513

Dep.

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Rev. No./Date

Ref. No.	Part Code	Description	Rating	Qty	Note
C 24		CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 25		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 26		CER CAP CK737F1H105Z	1μF +80/-20%	1	
C 27	1-300394	AL ELECTLT CAP CE04C1E221A	220μF ±20%, 25V	1	
C 28	1-300394	AL ELECTLT CAP CE04C1E221A	220μF ±20%, 25V	1	
C 29	1-411447	CER CAP CC924CH1H221J	220pF ±5%, 50V	1	
C 30	1-411471	CER CAP CC924CH1H271J	270pF ±5%, 50V	1	
C 31	1-411714	CER CAP CC924CH1H102J	1000pF ±5%, 50V	1	
C 32	1-421612	CER CAP CK924C1H472M	4700pF ±20%, 50V	1	
C 33		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 34		CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 35		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 36		CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 37		CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 38		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 39		NOT ASSIGN			
C 40		NOT ASSIGN			
C 41		NOT ASSIGN			
C 42		NOT ASSIGN			
C 43		NOT ASSIGN			
C 44		NOT ASSIGN			
C 45		NOT ASSIGN			

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Rev. No./Date

Ref. No.	Part Code	Description		Rating	Qty	Note
C 46		NOT ASSIGN				
C 47		NOT ASSIGN				
C 48		NOT ASSIGN				
C 49		NOT ASSIGN				
C 50		NOT ASSIGN				
C 51	1-411277	CER CAP	CC924CH1H101J	100pF ±5%, 50V	1	
C 52		TA ELECTLT CAP	SVFC1D475M	4.7μF ±20%, 20V	1	
C 53		CER CAP	CK732B1H103K	0.01μF ±10%, 50V	1	
C 54		CER CAP	CK733F1H104Z	0.1μF +80/-20%	1	
C 55		CER CAP	CK737F1H105Z	1μF +80/-20%	1	
C 56	1-300394	AL ELECTLT CAP	CE04C1E221A	220μF ±20%, 25V	1	
C 57	1-300394	AL ELECTLT CAP	CE04C1E221A	220μF ±20%, 25V	1	
C 58		TA ELECTLT CAP	SVFC1D475M	4.7μF ±20%, 20V	1	
C 59		CER CAP	CK732B1H103K	0.01μF ±10%, 50V	1	
C 60		CER CAP	CK733F1H104Z	0.1μF +80/-20%	1	
C 61		CER CAP	CK737F1H105Z	1μF +80/-20%	1	
C 62	1-300394	AL ELECTLT CAP	CE04C1E221A	220μF ±20%, 25V	1	
C 63	1-300394	AL ELECTLT CAP	CE04C1E221A	220μF ±20%, 25V	1	
C 64		TA ELECTLT CAP	SVFC1D475M	4.7μF ±20%, 20V	1	
C 65		CER CAP	CK732B1H103K	0.01μF ±10%, 50V	1	
C 66		CER CAP	CK733F1H104Z	0.1μF +80/-20%	1	
C 67		CER CAP	CK737F1H105Z	1μF +80/-20%	1	
C 68	1-300394	AL ELECTLT CAP	CE04C1E221A	220μF ±20%, 25V	1	

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Ref. No.	Part Code	Description	Rating	Qty	Note
C 69	1-300394	AL ELECTLT CAP CE04C1E221A	220μF ±20%, 25V	1	
C 70		TA ELECTLT CAP SVFC1D475M	4.7μF ±20%, 20V	1	
C 71		CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 72		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 73		CER CAP CK737F1H105Z	1μF +80/-20%	1	
C 74	1-300394	AL ELECTLT CAP CE04C1E221A	220μF ±20%, 25V	1	
C 75	1-300394	AL ELECTLT CAP CE04C1E221A	220μF ±20%, 25V	1	
C 76	1-300441	AL ELECTLT CAP CE04C1E331A	330μF ±20%, 25V	1	
C 77		AL ELECTLT CAP KMG25VB330(M)	330μF ±20%, 25V	1	
C 78		CER CAP CK737F1H105Z	1μF +80/-20%	1	
C 79		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 80		TA ELECTLT CAP SVFC1D475M	4.7μF ±20%, 20V	1	
C 81		CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 82		CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 83		AL ELECTLT CAP KMG25VB330(M)	330μF ±20%, 25V	1	
C 84	1-300441	AL ELECTLT CAP CE04C1E331A	330μF ±20%, 25V	1	
C 85		CER CAP CK737F1H105Z	1μF +80/-20%	1	
C 86		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 87		TA ELECTLT CAP SVFC1D475M	4.7μF ±20%, 20V	1	
C 88		CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 89		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 90		NOT ASSIGN			

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Ref. No.	Part Code	Description	Rating	Qty	Note
C 91		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 92		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 93	1-300335	AL ELECTLT CAP CE04C1E101A	100μF ±20%, 25V	1	
C 94		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 95		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 96		AL ELECTLT CAP KME250VB4.7(M)	4.7μF ±20%, 250V	1	
C 97	1-300335	AL ELECTLT CAP CE04C1E101A	100μF ±20%, 25V	1	
C 98		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 99		CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 100	1-300335	AL ELECTLT CAP CE04C1E101A	100μF ±20%, 25V	1	
C 101		CER CAP CK737F1H105Z	1μF +80/-20%	1	
C 102		CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 103		CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 104	1-300335	AL ELECTLT CAP CE04C1E101A	100μF ±20%, 25V	1	
C 105		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 106		CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 107		CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 108		CER CAP CK737F1H105Z	1μF +80/-20%	1	
C 109		CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 110		AL ELECTLT CAP KME200VB3.3(M)	3.3μF ±20%, 200V	1	
C 111		PLSTC FILM CAP CF922N2E104K	0.1μF ±10%, 250V	1	
C 112		AL ELECTLT CAP KME200VB3.3(M)	3.3μF ±20%, 200V	1	
C 113		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	

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Ref. No.	Part Code	Description	Rating	Qty	Note
C 114		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 115		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 116		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 117	1-420594	CER CAP CK732B1H472K	4700pF ±10%, 50V	1	
C 118		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 119		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 120	1-420594	CER CAP CK732B1H472K	4700pF ±10%, 50V	1	
C 121	1-300441	AL ELECTLT CAP CE04C1E331A	330μF ±20%, 25V	1	
C 122		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 123		CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 124		CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 125		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 126	1-300441	AL ELECTLT CAP CE04C1E331A	330μF ±20%, 25V	1	
C 127	1-300441	AL ELECTLT CAP CE04C1E331A	330μF ±20%, 25V	1	
C 128		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 129		CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 130		CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 131		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 132	1-300441	AL ELECTLT CAP CE04C1E331A	330μF ±20%, 25V	1	
C 133		NOT ASSIGN			
C 134		AL ELECTLT CAP KMG25VB330(M)	330μF ±20%, 25V	1	
C 135		AL ELECTLT CAP KMG25VB330(M)	330μF ±20%, 25V	1	

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Ref. No.	Part Code	Description	Rating	Qty	Note
C 136	1-300441	AL ELECTLT CAP CE04C1E331A	330μF ±20%, 25V	1	
C 137		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 138		CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 139		CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 140		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 141	1-300441	AL ELECTLT CAP CE04C1E331A	330μF ±20%, 25V	1	
C 142		NOT ASSIGN			
C 143		AL ELECTLT CAP KMG25VB330(M)	330μF ±20%, 25V	1	
C 144		AL ELECTLT CAP KMG25VB330(M)	330μF ±20%, 25V	1	
C 145		NOT ASSIGN			
C 146		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 147		NOT ASSIGN			
C 148		NOT ASSIGN			
C 149		NOT ASSIGN			
C 150		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 151		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 152		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 153		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 154		NOT ASSIGN			
C 155		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 156		CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 157		CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 158		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	

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Ref. No.	Part Code	Description	Rating	Qty	Note
C 159		CER CAP CK737F1H105Z	1μF +80/-20%	1	
C 160	1-413211	CER CAP CC732CK1H0R5C	0.5pF ±0.25pF	1	
C 161		CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 162		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 163		CER CAP CK737F1H105Z	1μF +80/-20%	1	
C 164	1-413211	CER CAP CC732CK1H0R5C	0.5pF ±0.25pF	1	
C 165		CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 166		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 167		CER CAP CK737F1H105Z	1μF +80/-20%	1	
C 168		CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 169		CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 170		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 171		CER CAP CK737F1H105Z	1μF +80/-20%	1	
C 172		CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 173		CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 174		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 175		CER CAP CK737F1H105Z	1μF +80/-20%	1	
C 176	1-413792	CER CAP CC732CH1H220J	22pF ±5%, 50V	1	
C 177		CER CAP CK737F1H105Z	1μF +80/-20%	1	
C 178		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 179		CER CAP CK737F1H105Z	1μF +80/-20%	1	
C 180		CER CAP CK737F1H105Z	1μF +80/-20%	1	

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Ref. No.	Part Code	Description	Rating	Qty	Note
C 181		CER CAP CK737F1H105Z	1μF +80/-20%	1	
C 182		CER CAP CK737F1H105Z	1μF +80/-20%	1	
C 183	1-300394	AL ELECTLT CAP CE04C1E221A	220μF ±20%, 25V	1	
C 184	1-300394	AL ELECTLT CAP CE04C1E221A	220μF ±20%, 25V	1	
C 185	1-300394	AL ELECTLT CAP CE04C1E221A	220μF ±20%, 25V	1	
C 186	1-300394	AL ELECTLT CAP CE04C1E221A	220μF ±20%, 25V	1	
C 187		NOT ASSIGN			
C 188		NOT ASSIGN			
C 189		NOT ASSIGN			
C 190		NOT ASSIGN			
C 191		NOT ASSIGN			
C 192		NOT ASSIGN			
C 193		NOT ASSIGN			
C 194		NOT ASSIGN			
C 195	1-300475	AL ELECTLT CAP CE04C1E470A	47μF ±20%, 25V	1	
C 196	1-300475	AL ELECTLT CAP CE04C1E470A	47μF ±20%, 25V	1	
C 197		NOT ASSIGN			
C 198		NOT ASSIGN			
C 199		NOT ASSIGN			
C 200		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 201		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 202		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 203		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	

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Ref. No.	Part Code	Description	Rating	Qty	Note
C 204		AL ELECTLT CAP SVFC1D475M	4.7μF ±20%, 20V	1	
C 205		AL ELECTLT CAP SVFC1D475M	4.7μF ±20%, 20V	1	
C 206		AL ELECTLT CAP SVFC1D475M	4.7μF ±20%, 20V	1	
C 207		AL ELECTLT CAP SVFC1D475M	4.7μF ±20%, 20V	1	
C 208		AL ELECTLT CAP SVFC1D475M	4.7μF ±20%, 20V	1	
C 209		AL ELECTLT CAP SVFC1D475M	4.7μF ±20%, 20V	1	
C 210		AL ELECTLT CAP KME16T2200(M)	2200μF ±20%, 16V	1	
C 211		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 212	1-245067	AL ELECTLT CAP CE04C1A101A	100μF ±20%, 10V	1	
C 213	1-411277	CER CAP CC924CH1H101J	100pF ±5%, 50V	1	
C 214	1-2959326	CER CAP CC731CH1H040C	4pF 50V ±0.25pF	1	
E 1		NOT ASSIGN			
E 2		NOT ASSIGN			
E 3		LC-2-S-YELLOW		1	
E 4		LC-2-S-YELLOW		1	
E 5		LC-2-S-YELLOW		1	
E 6		LC-2-S-YELLOW		1	
E 7		LC-2-S-YELLOW		1	
E 8		LC-2-S-YELLOW		1	
E 9		LC-2-S-YELLOW		1	
E 10		LC-2-S-YELLOW		1	
E 11		LC-2-S-YELLOW		1	

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Ref. No.	Part Code	Description	Rating	Qty	Note
E 12					
		LC-2-S-YELLOW		1	
E 13					
		LC-2-S-YELLOW		1	
E 14					
		LC-2-S-ORENGE		1	
E 15					
		LC-2-S-ORENGE		1	
E 16					
		LC-2-S-ORENGE		1	
E 17					
		LC-2-S-BLACK		1	
E 18					
		LC-2-S-ORENGE		1	
E 19					
		LC-2-S-ORENGE		1	
E 20					
		LC-2-S-ORENGE		1	
E 21					
		LC-2-S-YELLOW		1	
E 22					
		LC-2-S-YELLOW		1	
E 23		NOT ASSIGN			
E 24		NOT ASSIGN			
E 25		NOT ASSIGN			
E 26		NOT ASSIGN			
E 27		NOT ASSIGN			
E 28		NOT ASSIGN			
E 29					
		LC-2-S-BLACK		1	
E 30					
		LC-2-S-YELLOW		1	
E 31					
		LC-2-S-YELLOW		1	
J 1	1-1051428	PLUG			
		HIF3FC-40PA-2.54DSA		1	

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Ref. No.	Part Code	Description	Rating	Qty	Note
J 2	1-1050545	PLUG HIF3FC-26PA-2.54DSA		1	
J 3	*-34J62064	PLUG 27DP-R-PC-1		1	
J 4		JACK 27DP-LR-PC		1	
J 5	1-1732034	PLUG DF1-5P2.5DSA	05	1	
J 6		NOT ASSIGN			
J 7		NOT ASSIGN			
J 8		NOT ASSIGN			
J 9		NOT ASSIGN			
J 10	1-1004349	JACK DIC-252		1	
J 11		PLUG FFC-3AMEP		1	
J 12		PLUG FFC-2AMEP1		1	
J 13	1-1004349	CONNECTOR DIC-252		1	
J 14	1-1004349	CONNECTOR DIC-252		1	
J 15		FFC-2AMEP1		1	
J 16	1-1004349	CONNECTOR DIC-252		1	
J 17		FFC-3AMEP		1	
J 18		FFC-3AMEP		1	
J 19	1-1004349	CONNECTOR DIC-252		1	
J 20		FFC-3AMEP		1	
J 21	1-1004349	CONNECTOR DIC-252		1	
J 22	1-1004349	CONNECTOR DIC-252		1	
J 23		FFC-3AMEP		1	

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Ref. No.	Part Code	Description	Rating	Qty	Note
K 1	1-2338445	RELAY ATF203		1	
K 2	1-2338445	RELAY ATF203		1	
K 3	1-2338445	RELAY ATF203		1	
K 4	1-2338445	RELAY ATF203		1	
K 5	1-2338445	RELAY ATF203		1	
K 6	1-2338445	RELAY ATF203		1	
K 7	1-2338445	RELAY ATF203		1	
K 8		NOT ASSIGN			
K 9	1-2338445	RELAY ATF203		1	
K 10	1-2338445	RELAY ATF203		1	
K 11	1-2338445	RELAY ATF203		1	
K 12	1-2338445	RELAY ATF203		1	
L 1	1-914295	INDUCTOR NL453232-101K	100μH 0.11A	1	
L 2	1-914295	INDUCTOR NL453232-101K	100μH 0.11A	1	
L 3	1-914295	INDUCTOR NL453232-101K	100μH 0.11A	1	
L 4	1-914295	INDUCTOR NL453232-101K	100μH 0.11A	1	
L 5	1-914295	INDUCTOR NL453232-101K	100μH 0.11A	1	
L 6	1-914295	INDUCTOR NL453232-101K	100μH 0.11A	1	
L 7		NOT ASSIGN			
L 8	1-914295	INDUCTOR NL453232-101K	100μH 0.11A	1	
L 9	1-914295	INDUCTOR NL453232-101K	100μH 0.11A	1	

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Ref. No.	Part Code	Description	Rating	Qty	Note
L 10	1-914295	INDUCTOR NL453232-101K	100μH 0.11A	1	
L 11	1-914295	INDUCTOR NL453232-101K	100μH 0.11A	1	
L 12		INDUCTOR SN-3-200	10μH	1	
L 13		INDUCTOR SN-3-200	10μH	1	
L 14	1-914295	INDUCTOR NL453232-101K	100μH 0.11A	1	
L 15	1-914295	INDUCTOR NL453232-101K	100μH 0.11A	1	
L 16		INDUCTOR SN-8S-500	72μH	1	
L 17		INDUCTOR SN-8S-500	72μH	1	
L 18		INDUCTOR SN-8S-500	72μH	1	
L 19		NOT ASSIGN			
L 20		INDUCTOR NL453232-100K	10μH	1	
L 21	1-916743	INDUCTOR TSL1110-471K	470μH 0.46A	1	
L 22	1-916743	INDUCTOR TSL1110-471K	470μH 0.46A	1	
Q 1		DIODE 1S2210		1	
Q 2		DIODE 1S2210		1	
Q 3		IC LH0032CG		1	
Q 4		IC LH0002CH		1	
Q 5	1-35801	DIODE A1S2838		1	
Q 6		TRANSISTOR 2SC1623		1	
Q 7		NOT ASSIGN			
Q 8		TRANSISTOR 2SC1623		1	

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Ref. No.	Part Code	Description	Rating	Qty	Note
Q 9	1-35801	DIODE			
		A1S2838		1	
Q 10		TRANSISTOR			
		2SC1623		1	
Q 11		NOT ASSIGN			
Q 12		TRANSISTOR			
		2SC1623		1	
Q 13	1-35801	DIODE			
		A1S2838		1	
Q 14		TRANSISTOR			
		2SC1623		1	
Q 15	1-35801	DIODE			
		A1S2838		1	
Q 16		TRANSISTOR			
		2SC1623		1	
Q 17		NOT ASSIGN			
Q 18		TRANSISTOR			
		2SC1623		1	
Q 19		NOT ASSIGN			
Q 20		NOT ASSIGN			
Q 21		IC			
		NJU8001M		1	
Q 22	1-35763	DIODE			
		A1S2836		1	
Q 23	1-2333044	IC			
		UPC258G2		1	
Q 24		NOT ASSIGN			
Q 25	1-2333044	IC			
		UPC258G2		1	
Q 26		NOT ASSIGN			
Q 27		NOT ASSIGN			
Q 28		NOT ASSIGN			
Q 29		NOT ASSIGN			
Q 30		NOT ASSIGN			

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Ref. No.	Part Code	Description	Rating	Qty	Note
Q 31	1-1817650	IC AD849AQ		1	
Q 32		NOT ASSIGN			
Q 33	1-1817650	IC AD849AQ		1	
Q 34	1-50045	DIODE 1S953		1	
Q 35	1-2441424	TRANSISTOR 2SC2901		1	
Q 36	1-2441424	TRANSISTOR 2SC2901		1	
Q 37	1-50045	DIODE 1S953		1	
Q 38	1-2441220	TRANSISTOR 2SA1206		1	
Q 39	1-2441220	TRANSISTOR 2SA1206		1	
Q 40	1-1854792	TRANSISTOR 2SC3734		1	
Q 41	1-35801	IC A1S2838		1	
Q 42	1-1854792	TRANSISTOR 2SC3734		1	
Q 43	1-39238	ZENER DIODE RD11MB3		1	
Q 44	1-2497993	DIODE ES01F		1	
Q 45	1-2497993	DIODE ES01F		1	
Q 46	1-2497993	DIODE ES01F		1	
Q 47	1-2497993	DIODE ES01F		1	
Q 48	1-20910	TRANSISTOR 2SC3588-Z		1	
Q 49		TRANSISTOR 2SC1623		1	
Q 50	1-35801	DIODE A1S2838		1	
Q 51	1-175115	IC UPC458G2		1	
Q 52	1-35801	DIODE A1S2838		1	
Q 53		NOT ASSIGN			

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Ref. No.	Part Code	Description	Rating	Qty	Note
Q 54	1-35721	DIODE A1SS123		1	
Q 55		NOT ASSIGN			
Q 56	1-44932	ZENER DIODE 1SZ52		1	
Q 57		NOT ASSIGN			
Q 58	1-35801	DIODE A1S2838		1	
Q 59		TRANSISTOR 2SC1623		1	
Q 60		NOT ASSIGN			
Q 61		TRANSISTOR 2SC1623		1	
Q 62	1-175115	IC UPC458G2		1	
Q 63	1-44932	ZENER DIODE 1SZ52		1	
Q 64		TRANSISTOR 2SC1623		1	
Q 65		ZENER DIODE LM285Z-2.5		1	
Q 66	1-35801	DIODE A1S2838		1	
Q 67		NOT ASSIGN			
Q 68	1-1786835	IC 74HC541F		1	
Q 69	1-1787157	IC 74HC273F		1	
Q 70	1-1787157	IC 74HC273F		1	
Q 71	1-1787157	IC 74HC273F		1	
Q 72		NOT ASSIGN			
Q 73	1-2333044	IC UPC258G2		1	
Q 74	1-35721	DIODE A1SS123		1	
Q 75	1-76931	IC MC10H116M		1	

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Ref. No.	Part Code	Description	Rating	Qty	Note
Q 76	1-36310	ZENER DIODE RD5.1MB2		1	
Q 77	1-36310	ZENER DIODE RD5.1MB2		1	
Q 78	1-1855071	TRANSISTOR 2SA1461		1	
Q 79	1-2749925	TRANSISTOR PNP 2SA1978		1	
Q 80	1-2749925	TRANSISTOR PNP 2SA1978		1	
Q 81		TRANSISTOR 2SC2954		1	
Q 82		TRANSISTOR 2SC2954		1	
Q 83		NOT ASSIGN			
Q 84		NOT ASSIGN			
Q 85	1-35801	DIODE A1S2838		1	
Q 86		TRANSISTOR 2SA812M5,M6		1	
Q 87	1-1860547	FET 2SK368-Y		1	
Q 88	1-2649432	TRANSISTOR NPN 2SC4536		1	
Q 89	1-2649432	TRANSISTOR NPN 2SC4536		1	
Q 90	1-2649432	TRANSISTOR NPN 2SC4536		1	
Q 91	1-2649432	TRANSISTOR NPN 2SC4536		1	
R 1		VARIABLE RESISTOR RJ-5W103	10kΩ	1	
R 2		METAL FILM RESISTOR RN14K2E2052D	20.5kΩ ±0.5%,1/4W	1	
R 3		METAL FILM RESISTOR RN14K2E2053D	205kΩ ±0.5%,1/4W	1	
R 4		NOT ASSIGN			
R 5		NOT ASSIGN			

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Ref. No.	Part Code	Description	Rating	Qty	Note
R 6	1-612205	METAL FILM RESISTOR RN14K2E1500D	150Ω ±0.5%, 1/4W	1	
R 7		METAL FILM RESISTOR RN14K2E5360D	536Ω ±0.5%, 1/4W	1	
R 8	1-620470	METAL FILM RESISTOR RN14K2E90R9D	90.9Ω ±0.5%, 1/4W	1	
R 9		METAL FILM RESISTOR RN14K2E5360D	536Ω ±0.5%, 1/4W	1	
R 10		METAL FILM RESISTOR RN14K2E2940D	294Ω ±0.5%, 1/4W	1	
R 11	1-613686	METAL FILM RESISTOR RN14K2E2150D	215Ω ±0.5%, 1/4W	1	
R 12		METAL FILM RESISTOR RN14K2E2940D	294Ω ±0.5%, 1/4W	1	
R 13	1-613121	METAL FILM RESISTOR RN14K2E1870D	187Ω ±0.5%, 1/4W	1	
R 14	1-619641	METAL FILM RESISTOR RN14K2E7500D	750Ω ±0.5%, 1/4W	1	
R 15	1-613121	METAL FILM RESISTOR RN14K2E1870D	187Ω ±0.5%, 1/4W	1	
R 16	1-612337	METAL FILM RESISTOR RN14K2E1540D	154Ω ±0.5%, 1/4W	1	
R 17	1-619650	METAL FILM RESISTOR RN14K2E7501D	7.5kΩ ±0.5%, 1/4W	1	
R 18	1-612337	METAL FILM RESISTOR RN14K2E1540D	154Ω ±0.5%, 1/4W	1	
R 19		CERMET RESISTOR RK73M2A472J	4.7kΩ ±5%, 1/10W	1	
R 20		CERMET RESISTOR RK73M2A472J	4.7kΩ ±5%, 1/10W	1	
R 21		CERMET RESISTOR RK73M2A472J	4.7kΩ ±5%, 1/10W	1	
R 22		CERMET RESISTOR RK73M2A472J	4.7kΩ ±5%, 1/10W	1	
R 23		CERMET RESISTOR RK73M2A472J	4.7kΩ ±5%, 1/10W	1	
R 24		CERMET RESISTOR RK73M2A472J	4.7kΩ ±5%, 1/10W	1	
R 25		CERMET RESISTOR RK73M2A472J	4.7kΩ ±5%, 1/10W	1	
R 26		NOT ASSIGN			
R 27	1-835433	VARIABLE RESISTOR RG04B503H	50kΩ 1/4W	1	
R 28		CERMET RESISTOR RK73M2A473J	47kΩ ±5%, 1/10W	1	

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Ref. No.	Part Code	Description	Rating	Qty	Note
R 29	1-835395	VARIABLE RESISTOR RG04B103H	10kΩ 1/4W	1	
R 30	1-753348	CERMET RESISTOR RK73M2A105J	1MΩ ±5%, 1/10W	1	
R 31		CERMET RESISTOR RK73M2A472J	4.7kΩ ±5%, 1/10W	1	
R 32		CERMET RESISTOR RK73M2A472J	4.7kΩ ±5%, 1/10W	1	
R 33		CERMET RESISTOR RK73M2A102J	1kΩ ±5%, 1/10W	1	
R 34		NOT ASSIGN			
R 35		NOT ASSIGN			
R 36		NOT ASSIGN			
R 37		NOT ASSIGN			
R 38		NOT ASSIGN			
R 39		NOT ASSIGN			
R 40		NOT ASSIGN			
R 41		NOT ASSIGN			
R 42		NOT ASSIGN			
R 43		NOT ASSIGN			
R 44		NOT ASSIGN			
R 45		NOT ASSIGN			
R 46		NOT ASSIGN			
R 47		CERMET RESISTOR RK73M2A273J	27kΩ ±5%, 1/10W	1	
R 48		METAL FILM RESISTOR RN14K2E5620D	562Ω ±0.5%, 1/4W	1	
R 49	1-613503	METAL FILM RESISTOR RN14K2E2050D	205Ω ±0.5%, 1/4W	1	
R 50		METAL FILM RESISTOR RN14K2E8251D	8.25kΩ ±0.5%, 1/4W	1	

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Ref. No.	Part Code	Description	Rating	Qty	Note
R 51	1-835310	VARIABLE RESISTOR RG04B501H	500Ω 1/4W	1	
R 52	1-613503	METAL FILM RESISTOR RN14K2E2050D	205Ω ±0.5%, 1/4W	1	
R 53		METAL FILM RESISTOR RN14K2E8251D	8.25kΩ ±0.5%, 1/4W	1	
R 54	1-835310	VARIABLE RESISTOR RG04B501H	500Ω 1/4W	1	
R 55		METAL FILM RESISTOR RN14K2E2740D	274Ω ±0.5%, 1/4W	1	
R 56	1-613716	METAL FILM RESISTOR RN14K2E2151D	2.15kΩ ±0.5%, 1/4W	1	
R 57		CERMET RESISTOR RK73M2A100J	10Ω ±5%, 1/10W	1	
R 58	1-612230	METAL FILM RESISTOR RN14K2E1501D	1.5kΩ ±0.5%, 1/4W	1	
R 59	1-610407	METAL FILM RESISTOR RN14K2E1001D	1kΩ ±0.5%, 1/4W	1	
R 60	1-610407	METAL FILM RESISTOR RN14K2E1001D	1kΩ ±0.5%, 1/4W	1	
R 61	1-617568	METAL FILM RESISTOR RN14K2E49R9D	49.9Ω ±0.5%, 1/4W	1	
R 62	1-613716	METAL FILM RESISTOR RN14K2E2151D	2.15kΩ ±0.5%, 1/4W	1	
R 63		CERMET RESISTOR RK73M2A100J	10Ω ±5%, 1/10W	1	
R 64		CERMET RESISTOR RK73M2A100J	10Ω ±5%, 1/10W	1	
R 65		METAL FILM RESISTOR RN14K2E4750D	475Ω ±0.5%, 1/4W	1	
R 66		METAL FILM RESISTOR RN14K2E1821D	1.82kΩ ±0.5%, 1/4W	1	
R 67		CERMET RESISTOR RK73M2A100J	10Ω ±5%, 1/10W	1	
R 68		NOT ASSIGN			
R 69		NOT ASSIGN			
R 70		CERMET RESISTOR RK73M2A471J	470Ω ±5%, 1/10W	1	
R 71		CERMET RESISTOR RK73M2A101J	100Ω ±5%, 1/10W	1	
R 72		CERMET RESISTOR RK73M2A333J	33kΩ ±5%, 1/10W	1	
R 73		CERMET RESISTOR RK73M2A333J	33kΩ ±5%, 1/10W	1	

*: Selected at factory

Rev. No./Date

Ref. No.	Part Code	Description	Rating	Qty	Note
R 74	1-753348	CERMET RESISTOR RK73M2A105J	1MΩ ±5%, 1/10W	1	
R 75		CERMET RESISTOR RK73M2A222J	2.2kΩ ±5%, 1/10W	1	
R 76		CERMET RESISTOR RK73M2A104J	100kΩ ±5%, 1/10W	1	
R 77		CERMET RESISTOR RK73M2A103J	10kΩ ±5%, 1/10W	1	
R 78		CERMET RESISTOR RK73M2A103J	10kΩ ±5%, 1/10W	1	
R 79		CERMET RESISTOR RK73M2A121J	120Ω ±5%, 1/10W	1	
R 80		CERMET RESISTOR RK73M2A102J	1kΩ ±5%, 1/10W	1	
R 81	1-754387	CERMET RESISTOR RK73M2A224J	220kΩ ±5%, 1/10W	1	
R 82		CERMET RESISTOR RK73M2A103J	10kΩ ±5%, 1/10W	1	
R 83		CERMET RESISTOR RK73M2A822J	8.2kΩ ±5%, 1/10W	1	
R 84		CERMET RESISTOR RK73M2A222J	2.2kΩ ±5%, 1/10W	1	
R 85		CERMET RESISTOR RK73M2A473J	47kΩ ±5%, 1/10W	1	
R 86		CERMET RESISTOR RK73M2A103J	10kΩ ±5%, 1/10W	1	
R 87		CERMET RESISTOR RK73M2A104J	100kΩ ±5%, 1/10W	1	
R 88		CERMET RESISTOR RK73M2A103J	10kΩ ±5%, 1/10W	1	
R 89		CERMET RESISTOR RK73M2A153J	15kΩ ±5%, 1/10W	1	
R 90		CERMET RESISTOR RK73M2A103J	10kΩ ±5%, 1/10W	1	
R 91		CERMET RESISTOR RK73M2A103J	10kΩ ±5%, 1/10W	1	
R 92		CERMET RESISTOR RK73M2A473J	47kΩ ±5%, 1/10W	1	
R 93		CERMET RESISTOR RK73M2A103J	10kΩ ±5%, 1/10W	1	
R 94		CERMET RESISTOR RK73M2A751J	750Ω ±5%, 1/10W	1	
R 95	1-835433	VARIABLE RESISTOR RG04B503H	50kΩ 1/4W	1	

*: Selected at factory

Rev. No./Date

Ref. No.	Part Code	Description		Rating	Qty	Note
R 96	1-754387	CERMET RESISTOR	RK73M2A224J	220kΩ ±5%, 1/10W	1	
R 97		VARIABLE RESISTOR	RG04B504H	500kΩ 1/4W	1	
R 98	1-835417	VARIABLE RESISTOR	RG04B203H	20kΩ 1/4W	1	
R 99		CERMET RESISTOR	RK73M2A154J	150kΩ ±5%, 1/10W	1	
R 100		VARIABLE RESISTOR	RG04B504H	500kΩ 1/4W	1	
R 101	1-835417	VARIABLE RESISTOR	RG04B203H	20kΩ 1/4W	1	
R 102	1-754387	CERMET RESISTOR	RK73M2A224J	220kΩ ±5%, 1/10W	1	
R 103		VARIABLE RESISTOR	RG04B504H	500kΩ 1/4W	1	
R 104	1-835417	VARIABLE RESISTOR	RG04B203H	20kΩ 1/4W	1	
R 105		CERMET RESISTOR	RK73M2A472J	4.7kΩ ±5%, 1/10W	1	
R 106		CERMET RESISTOR	RK73M2A472J	4.7kΩ ±5%, 1/10W	1	
R 107		NOT ASSIGN				
R 108		NOT ASSIGN				
R 109		NOT ASSIGN				
R 110	1-759419	METAL FILM RESISTOR	RN73G2A103D	10kΩ ±0.5%, 1/10W	1	
R 111		METAL FILM RESISTOR	RN73G2A913D	91kΩ ±0.5%, 1/10W	1	
R 112		METAL FILM RESISTOR	RN73G2A601D	600Ω ±0.5%, 1/10W	1	
R 113	1-835310	VARIABLE RESISTOR	RG04B501H	500Ω 1/4W	1	
R 114	1-760174	METAL FILM RESISTOR	RN73G2A153D	15kΩ ±0.5%, 1/10W	1	
R 115	1-754387	CERMET RESISTOR	RK73M2A224J	220kΩ ±5%, 1/10W	1	
R 116		CERMET RESISTOR	RK73M2A562J	5.6kΩ ±5%, 1/10W	1	
R 117	1-754387	CERMET RESISTOR	RK73M2A224J	220kΩ ±5%, 1/10W	1	
R 118		CERMET RESISTOR	RK73M2A153J	15kΩ ±5%, 1/10W	1	

*: Selected at factory

Rev. No./Date

Ref. No.	Part Code	Description	Rating	Qty	Note
R 119		CERMET RESISTOR RK73M2A153J	15kΩ ±5%, 1/10W	1	
R 120		CERMET RESISTOR RK73M2A154J	150kΩ ±5%, 1/10W	1	
R 121	1-759800	METAL FILM RESISTOR RN73G2A123D	12kΩ ±0.5%, 1/10W	1	
R 122	1-759800	METAL FILM RESISTOR RN73G2A123D	12kΩ ±0.5%, 1/10W	1	
R 123	1-760174	METAL FILM RESISTOR RN73G2A153D	15kΩ ±0.5%, 1/10W	1	
R 124	1-760824	METAL FILM RESISTOR RN73G2A222D	2.2kΩ ±0.5%, 1/10W	1	
R 125	1-835352	VARIABLE RESISTOR RG04B202H	2kΩ 1/4W	1	
R 126	1-762550	METAL FILM RESISTOR RN73G2A562D	5.6kΩ ±0.5%, 1/10W	1	
R 127	1-754387	CERMET RESISTOR RK73M2A224J	220kΩ ±5%, 1/10W	1	
R 128	1-759800	METAL FILM RESISTOR RN73G2A123D	12kΩ ±0.5%, 1/10W	1	
R 129	1-754387	CERMET RESISTOR RK73M2A224J	220kΩ ±5%, 1/10W	1	
R 130		CERMET RESISTOR RK73M2A822J	8.2kΩ ±5%, 1/10W	1	
R 131	1-835395	VARIABLE RESISTOR RG04B103H	10kΩ 1/4W	1	
R 132		CERMET RESISTOR RK73M2A154J	150kΩ ±5%, 1/10W	1	
R 133		CERMET RESISTOR RK73M2A472J	4.7kΩ ±5%, 1/10W	1	
R 134		CERMET RESISTOR RK73M2A562J	5.6kΩ ±5%, 1/10W	1	
R 135		NOT ASSIGN			
R 136		NOT ASSIGN			
R 137		NOT ASSIGN			
R 138		NOT ASSIGN			
R 139		NOT ASSIGN			
R 140		NOT ASSIGN			

*: Selected at factory

Rev. No./Date

Ref. No.	Part Code	Description		Rating	Qty	Note
R 141		NOT ASSIGN				
R 142		NOT ASSIGN				
R 143		NOT ASSIGN				
R 144		NOT ASSIGN				
R 145	1-736052	RES ARRAY	RRS-8-103JA	10kΩ ±5%	1	
R 146	1-729579	RES ARRAY	RRS-4-103JA	10kΩ ±5%	1	
R 147		NOT ASSIGN				
R 148		NOT ASSIGN				
R 149		NOT ASSIGN				
R 150		CERMET RESISTOR	RK73M2A101J	100Ω ±5%, 1/10W	1	
R 151		CERMET RESISTOR	RK73M2A101J	100Ω ±5%, 1/10W	1	
R 152		CERMET RESISTOR	RK73M2A681J	680Ω ±5%, 1/10W	1	
R 153		CERMET RESISTOR	RK73M2A681J	680Ω ±5%, 1/10W	1	
R 154		CERMET RESISTOR	RK73M2A510J	51Ω ±5%, 1/10W	1	
R 155	1-761511	METAL FILM RESISTOR	RN73G2A332D	3.3kΩ ±0.5%, 1/10W	1	
R 156	1-760824	METAL FILM RESISTOR	RN73G2A222D	2.2kΩ ±0.5%, 1/10W	1	
R 157		METAL FILM RESISTOR	RN73G2A820D	82Ω ±0.5%, 1/10W	1	
R 158	1-835298	VARIABLE RESISTOR	RG04B201H	200Ω 1/4W	1	
R 159		CERMET RESISTOR	RK73M2A510J	51Ω ±5%, 1/10W	1	
R 160		CERMET RESISTOR	RK73M2A221J	220Ω ±5%, 1/10W	1	
R 161		CERMET RESISTOR	RK73M2A221J	220Ω ±5%, 1/10W	1	
R 162		CERMET RESISTOR	RK73M2A220J	22Ω ±5%, 1/10W	1	
R 163		CERMET RESISTOR	RK73M2A510J	51Ω ±5%, 1/10W	1	

*: Selected at factory

Rev. No./Date

Ref. No.	Part Code	Description	Rating	Qty	Note
R 164		NOT ASSIGN			
R 165		CERMET RESISTOR RK73M2A220J	22Ω ±5%, 1/10W	1	
R 166		CERMET RESISTOR RK73M2A510J	51Ω ±5%, 1/10W	1	
R 167		NOT ASSIGN			
R 168		NOT ASSIGN			
R 169		NOT ASSIGN			
R 170		NOT ASSIGN			
R 171		NOT ASSIGN			
R 172		NOT ASSIGN			
R 173		CERMET RESISTOR RK73M2A4R7J	4.7Ω ±5%, 1/10W	1	
R 174	1-818822	VARIABLE RESISTOR RGS4H201	200Ω 1/4W	1	
R 175		CERMET RESISTOR RK73M2A4R7J	4.7Ω ±5%, 1/10W	1	
R 176		CERMET RESISTOR RK73M2A103J	10kΩ ±5%, 1/10W	1	
R 177		NOT ASSIGN			
R 178		NOT ASSIGN			
R 179		NOT ASSIGN			
R 180		CERMET RESISTOR RK73M2A103J	10kΩ ±5%, 1/10W	1	
R 181		CERMET RESISTOR RK73M2A103J	10kΩ ±5%, 1/10W	1	
R 182	1-612205	METAL FILM RESISTOR RN14K2E1500D	150Ω ±0.5%, 1/4W	1	
R 183	1-2993842	CHIP RESISTOR RK731H1J220F	22Ω 0.0625W ±1%	1	
R 184	1-2960413	CHIP RESISTOR RK731K1J4R7J	4.7Ω 0.0625W ±5%	1	
R 185	1-2993842	CHIP RESISTOR RK731H1J220F	22Ω 0.0625W ±1%	1	

*: Selected at factory

Rev. No./Date

Ref. No.	Part Code	Description	Rating	Qty	Note
R 186	1-2960413	CHIP RESISTOR RK731K1J4R7J	4.7Ω 0.0625W ±5%	1	
R 187	1-2993842	CHIP RESISTOR RK731H1J220F	22Ω 0.0625W ±1%	1	
R 188	1-2960413	CHIP RESISTOR RK731K1J4R7J	4.7Ω 0.0625W ±5%	1	
R 189	1-2993842	CHIP RESISTOR RK731H1J220F	22Ω 0.0625W ±1%	1	
R 190	1-2960413	CHIP RESISTOR RK731K1J4R7J	4.7Ω 0.0625W ±5%	1	
T 1		W39T5482 TRANSFORMER		1	

*: Selected at factory

Parts List of : MW0945B
A3 AO

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Ref. No.	Part Code	Description	Rating	Qty	Note
C 1	1-300734	AL ELECTLT CAP CE04C1H100A	10μF ±20%, 50V	1	
C 2	1-300734	AL ELECTLT CAP CE04C1H100A	10μF ±20%, 50V	1	
C 3	1-300475	AL ELECTLT CAP CE04C1E470A	47μF ±20%, 25V	1	
C 4	1-300475	AL ELECTLT CAP CE04C1E470A	47μF ±20%, 25V	1	
C 5		CER CAP CK737F1H105Z	1μF +80/-20%	1	
C 6		CER CAP CK737F1H105Z	1μF +80/-20%	1	
C 7		CER CAP CK737F1H105Z	1μF +80/-20%	1	
C 8		CER CAP CK737F1H105Z	1μF +80/-20%	1	
C 9		CER CAP CK737F1H105Z	1μF +80/-20%	1	
C 10	1-420675	CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 11	1-420675	CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 12	1-420675	CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 13	1-420675	CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 14	1-420675	CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 15		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 16		NOT ASSIGN			
C 17		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 18	1-300769	AL ELECTLT CAP CE04C1H101A	100μF ±20%, 50V	1	
C 19	1-2959512	CER CAP CC731CH1H820J	82pF 50V ±5%	1	
C 20	1-2959423	CER CAP CC731CH1H220J	22pF 50V ±5%	1	
E 1		LC-2-S RED		1	
J 1	1-1214076	SOCKET DF1-8S2.5R24-10B-1		1	

Rev. No./Date

DESIGNED BY 931207

CHECKED BY 931208

APPROVED BY 931208

Dep.

*: Selected at factory

DRAWING No. W4W23030 1/3

Rev. No./Date

Ref. No.	Par: Code	Description	Rating	Qty	Note
J 2		JACK 27DP-R-PC-1		1	
J 3		JACK 27DP-LR-PC		1	
Q 1		IC PS2007B		1	
Q 2	1-43090	ZENER DIODE RD9.1MB2		1	
Q 3	1-44932	ZENER DIODE 1SZ52		1	
Q 4		NOT ASSIGN			
Q 5		TRANSISTOR 2SC3356		1	
Q 6		TRANSISTOR 2SC3356		1	
Q 7		IC MC-5156		1	
Q 8	1-3221797	BGY687		1	
R 1		CERMET RESISTOR RK73M2A510J	51Ω ±5%, 1/10W	1	
R 2		CERMET RESISTOR RK73M2A152J	1.5kΩ ±5%, 1/10W	1	
R 3		CARBON FILM RES ARD25T102J	1kΩ ±5%, 1/4W	1	
R 4		CERMET RESISTOR RK73M2A101J	100Ω ±5%, 1/10W	1	
R 5		NOT ASSIGN			
R 6		NOT ASSIGN			
R 7		CERMET RESISTOR RK73M2A102J	1kΩ ±5%, 1/10W	1	
R 8		CERMET RESISTOR RK73M2A472J	4.7kΩ ±5%, 1/10W	1	
R 9	1-592611	METAL FILM RESISTOR RS1FS221JL	220Ω ±5%, 1W	1	
R 10		METAL FILM RESISTOR RS1FS681JL	680Ω ±5%, 1W	1	

*: Selected at factory

Rev. No./Date

Ref. No.	Part Code	Description	Rating	Qty	Note
R 11		NOT ASSIGN			
R 12	1-835603	VARIABLE RESISTOR RG04B101V	100Ω ±20%, 1/4W	1	
R 13		NOT ASSIGN			
R 14		NOT ASSIGN			
P 15		NOT ASSIGN			
R 16		NOT ASSIGN			
R 17		NOT ASSIGN			
R 18		NOT ASSIGN			
Z 1		MIXER M-7		1	
Z 2		CRYSTAL OSC TCO-313B(120MHZ)		1	
Z 3		NOT ASSIGN			
Z 4		FILTER ZJK5103-05		1	

*: Selected at factory

Parts List of : MW0946B
A3 AO

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Ref. No.	Part Code	Description	Rating	Qty	Note
C 1	1-300734	AL ELECTLT CAP CE04C1H100A	10μF ±20%, 50V	1	
C 2	1-300734	AL ELECTLT CAP CE04C1H100A	10μF ±20%, 50V	1	
C 3	1-300475	AL ELECTLT CAP CE04C1E470A	47μF ±20%, 25V	1	
C 4	1-300475	AL ELECTLT CAP CE04C1E470A	47μF ±20%, 25V	1	
C 5		CER CAP CK737F1H105Z	1μF +80/-20%	1	
C 6		CER CAP CK737F1H105Z	1μF +80/-20%	1	
C 7		CER CAP CK737F1H105Z	1μF +80/-20%	1	
C 8		CER CAP CK737F1H105Z	1μF +80/-20%	1	
C 9		CER CAP CK737F1H105Z	+80/-20%	1	
C 10	1-420675	CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 11	1-420675	CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 12	1-420675	CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 13	1-420675	CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 14	1-420675	CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 15		CK733F1H104Z	0.1μF +80/-20%	1	
C 16		CER CAP CK733F1H104Z			
C 17		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 18	1-300769	AL ELECTLT CAP CE04C1H101A	100μF ±20%, 50V	1	
C 19	1-2959512	CER CAP CC731CH1H820J	82pF 50V ±5%	1	
C 20	1-2959423	CER CAP CC731CH1H220J	22pF 50V ±5%	1	
E 1		LC-2-S RED		1	
J 1	1-1214076	SOCKET DF1-8S2.5R24-10B-1		1	

Rev. No./Date

CHECKED BY 931208

*: Selected at factory

DRAWING No. W4W23033 1/3

Rev. No./Date

Ref. No.	Part Code	Description	Rating	Qty	Note
J 2		JACK 27DP-R-PC-1		1	
J 3		JACK 27DP-LR-PC		1	
Q 1		IC PS2007B		1	
Q 2	1-43090	ZENER DIODE RD9.1MB2		1	
Q 3	1-44932	ZENER DIODE 1SZ52		1	
Q 4		NOT ASSIGN			
Q 5		TRANSISTOR 2SC3356		1	
Q 6		TRANSISTOR 2SC3356		1	
Q 7		IC MC-5156		1	
Q 8	1-3221797	BGY687		1	
R 1		CERMET RESISTOR RK73M2A510J	51Ω ±5%, 1/10W	1	
R 2		CERMET RESISTOR RK73M2A152J	1.5kΩ ±5%, 1/10W	1	
R 3		CARBON FILM RE ARD25T102J	1kΩ ±5%, 1/4W	1	
R 4		CERMET RESISTOR RK73M2A101J	100Ω ±5%, 1/10W	1	
R 5		NOT ASSIGN			
R 6		NOT ASSIGN			
R 7		CERMET RESISTOR RK73M2A102J	1kΩ ±5%, 1/10W	1	
R 8		CERMET RESISTOR RK73M2A472J	4.7kΩ ±5%, 1/10W	1	
R 9	1-592611	METAL FILM RESISTOR RS1FS221JL	220Ω ±5%, 1W	1	
R 10		METAL FILM RESISTOR RS1FS681JL	680Ω ±5%, 1W	1	

*: Selected at factory

Rev. No./Date

Ref. No.	Part Code	Description	Rating	Qty	Note
R 11		NOT ASSIGN			
R 12	1-835603	VARIABLE RESISTOR RG04B101V	100Ω ±20%, 1/4W	1	
R 13		VARIABLE RESISTOR RG04B101V			
R 14		NOT ASSIGN			
R 15		NOT ASSIGN			
R 16		NOT ASSIGN			
R 17		NOT ASSIGN			
R 18		NOT ASSIGN			
R 19		NOT ASSIGN			
Z 1		MIXER M-7		1	
Z 2		TCO-313B(120MHZ)		1	
Z 3		CRYSTAL OSC TCO-313B(100.64MHZ)			
Z 4		FILTER ZJK5103-05		1	

*: Selected at factory

Parts List of : MW0947B
A3 AO

4

Ref. No.	Part Code	Description	Rating	Qty	Note
C 1	1-300734	AL ELECTLT CAP CE04C1H100A	10μF ±20%, 50V	1	
C 2	1-300734	AL ELECTLT CAP CE04C1H100A	10μF ±20%, 50V	1	
C 3	1-300475	AL ELECTLT CAP CE04C1E470A	47μF ±20%, 25V	1	
C 4	1-300475	AL ELECTLT CAP CE04C1E470A	47μF ±20%, 25V	1	
C 5		CER CAP CK737F1H105Z	1μF +80/-20%	1	
C 6		CER CAP CK737F1H105Z	1μF +80/-20%	1	
C 7		CER CAP CK737F1H105Z	1μF +80/-20%	1	
C 8		CER CAP CK737F1H105Z	1μF +80/-20%	1	
C 9		CER CAP CK737F1H105Z	1μF +80/-20%	1	
C 10	1-420675	CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 11	1-420675	CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 12	1-420675	CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 13	1-420675	CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 14	1-420675	CER CAP CK732B1H103K	0.01μF ±10%, 50V	1	
C 15		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 16		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 17		CER CAP CK733F1H104Z	0.1μF +80/-20%	1	
C 18	1-300769	AL ELECTLT CAP CE04C1H101A	100μF ±20%, 50V	1	
C 19	1-2959512	CER CAP CC731CH1H820J	82pF 50V ±5%	1	
C 20	1-2959423	CER CAP CC731CH1H220J	22pF 50V ±5%	1	
E 1		LC-2-S-RED		1	
J 1	1-1214076	SOCKET DF1-8S2.5R24-10B-1		1	

Rev. No./Date

DESIGNED BY 931207

CHECKED BY 931208

APPROVED BY 931208

Dep.

*: Selected at factory

DRAWING No. W4W22252 1/3

Rev. No./Date

Ref. No.	Part Code	Description	Rating	Qty	Note
J 2		JACK 27DP-R-PC-1		1	
J 3		JACK HRM300-126S		1	
K 1		RELAY 712-12		1	
Q 1		IC PS9601		1	
Q 2	1-43090	ZENER DIODE RD9.1MB2		1	
Q 3	1-44932	DIODE 1SZ52		1	
Q 4	1-50428	DIODE 1S2837		1	
Q 5		TRANSISTOR 2SC3356		1	
Q 6		TRANSISTOR 2SC3356		1	
Q 7		IC MC-5156		1	
Q 8	1-3221797	BGY687		1	
R 1		CERMET RESISTOR RK73M2A510J	51Ω ±5%, 1/10W	1	
R 2		CERMET RESISTOR RK73M2A152J	1.5kΩ ±5%, 1/10W	1	
R 3		CARBON FILM RES ARD25T102J	1kΩ ±5%, 1/4W	1	
R 4		CERMET RESISTOR RK73M2A101J	100Ω ±5%, 1/10W	1	
R 5		NOT ASSIGN			
R 6		NOT ASSIGN			
R 7		CERMET RESISTOR RK73M2A102J	1kΩ ±5%, 1/10W	1	
R 8		CERMET RESISTOR RK73M2A472J	4.7kΩ ±5%, 1/10W	1	

Rev. No./Date

Ref. No.	Part Code	Description	Rating	Qty	Note
R 9	1-592611	METAL FILM RESISTOR RS1FS221JL	220Ω ±5%, 1W	1	
R 10		RS1FS681JL	680Ω ±5%, 1W	1	
R 11		NOT ASSIGN			
R 12	1-835603	VARIABLE RESISTOR RG04B101V	100Ω 1/4W	1	
R 13	1-835603	VARIABLE RESISTOR RG04B101V	100Ω 1/4W	1	
R 14		NOT ASSIGN			
R 15		NOT ASSIGN			
R 16		NOT ASSIGN			
R 17		NOT ASSIGN			
R 18		NOT ASSIGN			
R 19		NOT ASSIGN			
Z 1		MIXER M-7		1	
Z 2		CRYSTAL OSC TCO-313B(120MHZ)		1	
Z 3		CRYSTAL OSC TCO-313B(100.64MHZ)		1	
Z 4		FILTER ZJK5103-05		1	

*: Selected at factory

(Blank)

MP MASTER
MA35858
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